

The

Communicator

July—August 2022



SARC



Surrey Emergency Program Amateur Radio



separ

EMERGENCY COMMUNICATIONS



PUBLICATION CONTACTS

COMMUNICATOR John Schouten VE7TI
& **BLOG EDITOR** [communicator at ve7sar.net](mailto:communicator@ve7sar.net)

SARC TELEPHONE (604) 802-1825

CORRESPONDENCE 12144 - 57A Avenue
Surrey, BC V3X 2S3
[SARC at ve7sar.net](mailto:SARC@ve7sar.net)

CONTRIBUTING EDITORS John Brodie VA7XB
Kevin McQuiggin VE7ZD/KN7Q

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Our article reprint policy is on page 120

Issues appear bi-monthly, on odd-numbered months, for area Amateur Radio operators and beyond, to enhance the exchange of information and to promote ham radio activity.

During non-publication months we encourage you to visit the Digital Communicator at ve7sar.blogspot.ca, which includes recent news, past issues of *The Communicator*, our history, photos, videos and other information.

To subscribe, unsubscribe or change your address for e-mail delivery of this electronic journal, notify [communicator @ ve7sar.net](mailto:communicator@ve7sar.net)

If you find *The Communicator* worthwhile, regular readers who are not SARC members are invited to contribute a \$5 annual [donation](#) towards our Field Day fund via [PayPal](#).

SARC maintains a website at www.ve7sar.net

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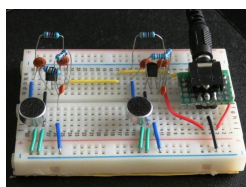
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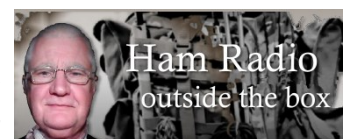
Daniel Romila is back with several [projects](#) and information on a variety of electronics.

A new columnist joins us.

We're pleased to welcome

John VA3KOT and

'Ham Radio Outside the Box'



This issue, Kevin VE7ZD writes about 'Extra-curricular' Amateur Radio

...and so much more!



QRM

---.---.---

...from the Editor's Shack

Do you have a photo or bit of Ham news to share? An Interesting link?

Something to sell or something you are looking for?

eMail it to [communicator at ve7sar.net](mailto:communicator@ve7sar.net) for inclusion in this publication.

Jinty VA7JMR is leaving Amateur Radio. We are very sorry to hear that she has decided to hang up her microphone, I for one will miss her Scottish lilt on net nights.

Jinty has participated in many of our events - both SARC and SEPAR, including school demonstrations, Surrey Doors Open, contests, Field Days, as Radio-Active columnist for The Communicator, and as social planner. We will miss your rolling RRRR's and your energy.

We can appreciate your reasons for retiring from our organizations but please know how much we have valued your contributions over the years.

Member or not, you will always be welcome at SARC and SEPAR.

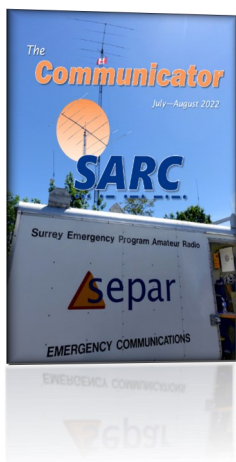
events resume, This summer however we have an on-going course and a number of antenna workshop for our Basic class students. Our July and August meetings will be social gatherings and our regular meetings will resume in September... hopefully in person.

We also have a new (to us) event on the [August calendar](#). We are inviting hams to our 'Cruise-In' where we hope to see various functional mobile installations and grab 'n go kits demonstrated. It should also be a great opportunity for some chit-chat and camaraderie.

Enjoy this issue, please provide us some feedback. And we'll be back again in September.

73,

~ John VE7TI, Editor
communicator@ve7sar.net



Summer generally provides us with a bit of a break before our fall

This Month's Cover...

We encourage our members to take photos at our events and to share them with other members. Field Day is no exception. Andrew Matecha VA7EKA sent us this one, which depicts our emergency communications trailer in front of our 100+ foot mobile tower.

On the Web

ve7sar.net

Between Communicators, watch your e-mail for news, announcements of Amateur Radio events, monthly meetings and training opportunities.

Click the links below to follow our presence on the web and social media:

SARC Blog

ve7sar.blogspot.ca

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FaceBook

[SurreyAmateurRadio](https://www.facebook.com/SurreyAmateurRadio)

Our YouTube Channel

[SurreyARC](https://www.youtube.com/SurreyARC)

SARC Photo Albums

Web Albums

or

tinyurl.com/SARCphoto

"Any sufficiently advanced technology is indistinguishable from magic"—Arthur C Clarke



The Rest Of The Story...

Early wireless radio telephony pioneer



**Nathan
Stubblefield**

Nathan Beverly Stubblefield (November 22, 1860 - March 28, 1928) was an American inventor best known for his wireless telephone work. Self-described as a "practical farmer, fruit grower and electrician", he received widespread attention in early 1902 when he gave a series of public demonstrations of a battery-operated wireless telephone, which could be transported to different locations and used on mobile platforms such as boats. While this initial design employed conduction, in 1908 he received a U.S. patent for a wireless telephone system that used magnetic induction. However, he was ultimately unsuccessful in commercializing his inventions. He later went into seclusion, and died alone in 1928.

Disagreement exists whether Stubblefield's communications technology can be classified as radio, and if his 1902 demonstrations could be considered the first "radio broadcasts". Most reviews of his efforts have concluded that they were not radio transmissions, because his devices, although they used a form of "wireless", employed conduction and inductive fields, while the standard definition of radio

is the transmission of electromagnetic radiation. However, Stubblefield may have been the first to simultaneously transmit audio wirelessly to multiple receivers, albeit over relatively short distances, while predicting the eventual development of broadcasting on a national scale.

Early years and family life

Stubblefield was the second of seven sons of William "Captain Billy" Jefferson Stubblefield (1830-1874), a Confederate Army veteran and lawyer, and Victoria Bowman (1837-1869), who died of scarlet fever. Stubblefield grew up in Murray, Kentucky, and his education included tutoring by a governess, followed by attendance at a boarding school in nearby Farmington called the "Male and Female Institute". His formal education ended in 1874, at the age of 14, with his father's death, which left Stubblefield an orphan in the care of his step-mother. However, he continued to develop his technical knowledge by reading contemporary scientific publications, such as *Scientific American* and *Electrical World*.

In 1881 he married Ada Mae Buchannan, by whom he had nine children, two dying in infancy. Six of Nathan's surviving children left no descendants. The seventh, Oliver (RayJack), married Priscilla Alden, who gave birth to two daughters and Nathan's only grandson, Keith Stubblefield, who would become a television and recording personality under the professional name Troy Cory.

Initially Stubblefield supported his family by farming. (His farm land later became part of the campus of Murray State University.) From 1907 to 1911, he operated a home school called "The Nathan Stubblefield Industrial School," or "Téléph-on-délgreen Industrial School".

Despite very limited finances, in his spare time Stubblefield worked on developing a series of inventions. His first patent, U.S. Patent 329,864, was issued on November 3, 1885, for a tool for lighting coal oil lamps without having to remove the glass chimney.

Acoustic telephone

In late 1886, Stubblefield began to sell and install acoustic telephones—an early and somewhat limited form of the telephone, which, instead of using electricity, employed a taut wire to carry sound vibrations directly between two soundboxes which were located at the far ends of the wire. Although most installations were around Murray, he also made sales as far away as Mississippi and Oklahoma. On February 21, 1888, Stubblefield and partner Samuel Holcomb received U.S. Patent 378,183 for their "mechanical telephone" design. However, the establishment of a local Bell Telephone franchise, whose electric telephones were far superior to Stubblefield's offerings, ended most of the acoustic sales by 1890.

Earth battery

In 1898, Stubblefield was issued U.S. Patent 600,457 for an "electric battery", which was an electrolytic coil of iron and insulated copper wire that was immersed in liquid or buried in the ground. Stubblefield made the unsubstantiated claim that, combined with normal battery operation, his device also drew additional power from the earth. However, it did successfully serve as both a power source and ground terminal for wireless telephony.

Wireless telephony

After the winding-down of his acoustic telephone business, Stubblefield reviewed possible alternatives that would avoid infringing on the Bell telephone patents, and began researching wireless options. Because he never filed for a patent for his early work, the technical details of his experiments are largely unknown. But, based on contemporary descriptions, it appears that they initially employed induction, similar to a wireless telephone developed by Amos Dolbear, which was issued U.S. Patent 378,183 in 1886. Information for this period is very limited, but in 1935 a former neighbor, Rainey T. Wells, reported that in 1892 Stubblefield gave him a telephone receiver, and had Wells



"MR. STUBBLEFIELD RECEIVING MESSAGES BY WIRELESS TELEPHONE. Note the two steel rods in the ground, which establish connection with the electrical currents of the earth, being connected by 30 feet [10 meters] of wire attached to the receiver."



A much more ambitious demonstration was given on January 1, 1902.

walk a short distance away from Stubblefield's shack, after which he was amazed to distinctly hear the words "Hello, Rainey", followed by additional speech from Stubblefield.

Because later references refer to earth connections, it appears that Stubblefield subsequently switched to using ground currents instead of induction. Following a decade of research and testing, he felt that his wireless telephone had now been perfected to the point that it was ready for commercialization, and began a series of demonstrations to publicize his work and attract investment. On Christmas Eve, December 24, 1901, he successfully transmitted $\frac{1}{4}$ mile (400 meters) to his home, where "A party of children were gathered there and at the receiver obtained messages from Santa Claus", and had local residents sign affidavits attesting to the success of his tests.

A much more ambitious demonstration was given on January 1, 1902. Assisted by his 14-year-old son, Bernard, "hundreds of people" in Murray witnessed a test where "From a station in the law office of a friend over a transmitter of his own invention [Stubblefield] gave his friends a New Year's greeting by wireless telephony, and at seven stations, located in different business houses and offices in the town, the message was simultaneously delivered. Music, songs, whispered conversations could be heard with perfect ease." This in turn attracted the attention of the St. Louis Post-Dispatch, which sent a reporter to Murray to personally review Stubblefield's wireless telephone. A detailed, and positive, account appeared in the newspaper, which quoted an optimistic Stubblefield as saying that, in addition to point-to-point private communication, his system was "capable of sending



simultaneous messages from a central distributing station over a very wide territory. For instance, anyone having a receiving instrument, which would consist merely of a telephone receiver and a signalling gong, could, upon being signalled by a transmitting station in Washington, or nearer, if advisable, be informed of weather news. My apparatus is capable of sending out a gong signal, as well as voice messages. Eventually, it will be used for the general transmission of news of every description."

However, the unrestricted reception of signals from Stubblefield's device meant that there was still a major limitation in its intended use for personal communication. Although he exuberantly declared: "The possibilities of the invention seem to be practically unlimited, and it will be no more than a matter of time when conversation over long distances between the great cities at the country will be carried on daily without wires", he also admitted: "I have as yet devised no method whereby it can be used with privacy. Wherever there is a receiving station the signal and message may be heard simultaneously. Eventually I, or some one, will discover a method of tuning the transmitting and receiving instruments so that each will answer only to its mate."

At this point a promoter, Gerald Fennel, traveled to Murray from New York City to enlist Stubblefield in a commercial venture. While negotiating, Stubblefield next embarked on his most publicized promotional trip. On March 20, 1902, he demonstrated his system in Washington, D.C., where voice and music transmissions were made over a third of a mile (535 meters) from the steamer Bartholdi, anchored in the Potomac River, to shore. This particular test was reported in prestigious scientific publications, including *Scientific American*, which claimed that Stubblefield's invention would be installed by the "Gordon Telephone Company, of Charleston, S. C., for the establishment of

telephonic communication between the city of Charleston and the sea islands lying off the coast of South Carolina", and *Nature*, which noted: "The system used is an earth-conduction one, and is, therefore, similar in principle to, though doubtless differing in detail from, many other wireless telephony systems which are being tried in various countries."

In early 1902 three New York City residents, J. B. Green, W. B. Whelpley, and Wm. T. Quinn, incorporated, in the Territory of Arizona, the Wireless Telephone Company of America. The firm had a \$5,000,000 capitalization, with shares set at a par value of \$1 each. Gerald Fennel offered Stubblefield 500,000 shares of stock in exchange for the rights to his wireless telephone technology. A June 1902 stock-promotion advertisement for the company,

TO TRY WIRELESS TÉLÉPHONY.

Inventor Stubblefield to Give an Exhibition of His Apparatus Thursday on the Potomac River.

Special to The New York Times.

LEXINGTON, Ky., March 16.—On Thursday, on the Potomac River, at Washington, D. C., Nathan Stubblefield, inventor of an apparatus which he declares will enable persons to communicate with each other at different points without the aid of wires such as are used in ordinary telephones, will give a demonstration of his machine. Stubblefield is now in Washington, where he went to secure patents on his apparatus, and will invite experts to the performance. "The start will be made at noon," he says in a dispatch to-night. "I have chartered a boat suitable for the test and will have several other boats on the river on which receivers will be placed. I will show how it is possible to manipulate vessels at sea by the use of wireless telephony."

At his Kentucky home he placed his apparatus in the Court House yard and receivers in the offices of the County Attorney, County Judge, and Sheriff, and in two or three dry goods houses, all separated and not connected either with his central station or with each other by wires, and he says he talked to all points at one time. Then he had not perfected his long-distance apparatus.

The New York Times

Published: March 17, 1902
Copyright © The New York Times



He carefully documented his progress, preparing affidavits that in 1903 he had transmitted 375 feet (114 m), and in 1904 reached 600 feet (180 m). The total wire required for the transmitting and receiving coils was greater than the distance between the transmitter and receiver...

echoing the excessive claims of contemporary wireless telegraph companies, proclaimed: "With the vast savings made in cost and maintenance by the Stubblefield system, it is not unreasonable to expect that the earnings of Bell Telephone will be easily equalled by those of this company. Its stock at 25c. places the subscriber on the same basis as the earliest investors in Bell, whose profits have amounted to over 2,000%". This advertisement also stated that regional sub-companies would be established throughout the United States.

With travel expenses financed by Fennel, Stubblefield made additional successful demonstrations in Philadelphia from May 30 to June 7, 1902, spanning a distance of around a mile (1600 meters). Tests followed in New York City beginning on June 11, 1902, which were less successful, with the explanation for the difficulties encountered including the rocky soil in Battery Park, and electrical interference from local alternating current power distribution.



Stubblefield quickly became distrustful of the promoters behind the Wireless Telephone Company of America, and, in a letter dated June 19, 1902, severed his connections as a director after expressing his concern that the company was being fraudulently run. Two months later, the company announced that it had merged its operations with the Collins Wireless Telephone & Telegraph Company, a company that had been organized to promote the work of Archie Frederick Collins, who had been doing research on conductive and inductive wireless telephone systems very

similar to Stubblefield's. The fanciful stock solicitations now claimed that there were plans to "license subsidiary companies in each state of the Union".

Stubblefield returned to Murray, where he faced considerable skepticism—a March 1903 review of his "earth battery" and wireless telephony endeavors stated: "...the people in this section of the country are yet wondering whether he is simply a crank or will yet emerge some day from his obscurity to astonish the whole civilized world with a great discovery". Later that same year, he posted a Public Notice in the Murray Ledger stating that the Wireless Telephone Company of America had "gone out of existence", and "My inventions have reverted back to me." He also noted that he was continuing his wireless telephone research, using the "over two thousand dollars" he had received from that company's promoter.

Stubblefield returned once again to investigating using induction, rather than conduction, for his wireless telephone system. This approach employed large circular induction coils, that no longer needed ground connections. He carefully documented his progress, preparing affidavits that in 1903 he had transmitted 375 feet (114 m), and in 1904 reached 600 feet (180 m). The total wire required for the transmitting and receiving coils was greater than the distance between the transmitter and receiver, but the invention allowed mobility. Bernard Stubblefield reported that in 1907, using a 60-foot (18 m) coil, transmitting and receiving spanned "¼ mile (400 meters) nicely."

Encountering difficulty in obtaining a patent, Nathan Stubblefield moved for a time to Washington, D.C. to speed

up the process. On May 12, 1908, he was granted U.S. patent 887,357 for his new version of a wireless telephone. The patent application stated that it would be usable for "securing telephonic communications between moving vehicles and way stations". An accompanying diagram shows wireless telephony from a fixed location to passing trains, boats, and wagons.

Despite receiving a patent and some financial backing from Murray residents, and the assertion that "while messages have been sent for distances less than ten miles, he is confident that with his machine he can talk across the Atlantic", Stubblefield made no headway in commercializing his latest invention. By now continuous-wave arc and alternator radio transmitters had been developed, which were capable of wireless telephone communication over distances that dwarfed the short ranges attainable by induction wireless systems, in addition to being able to be tuned to multiple transmitting frequencies. The invention of vacuum-tube radio transmitters in the mid-1910s would make possible, in the early 1920s, the nationwide broadcasting that Stubblefield had envisioned in 1902. But Stubblefield himself made no further progress beyond his previous work.

Final years

Stubblefield later lived in self-imposed isolation in a crude shelter near Almo, Kentucky and died around March 28, 1928, although his body, "gnawed by rats", was not discovered until a couple days later. Although many later accounts state that he died of starvation, at the time of his death a coroner was quoted as saying "he apparently was a victim of heart disease". He was initially buried in an unmarked grave in the Bowman family cemetery in Murray, Kentucky.

Legacy

Although Stubblefield's inventions did not lead directly to the development of radio technology, the public demonstrations in 1902 and the extensive press coverage may have helped spur interest in the possibilities of wireless transmission of voice and music, as most prior inventors had merely sought to provide point-to-point communication, to compete with telephone and telegraph companies.

Since his death, various individuals and groups in Murray, Kentucky, have promoted Murray as the Birthplace of Radio, and Stubblefield as the Father of Broadcasting. Loren J. Hortin, Journalism Professor at Murray State, organized his students to investigate Stubblefield's work, leading to the dedication of a monument on the campus in 1930. Hortin, adopting an expanded definition of "radio" to include wireless transmissions that did not employ electromagnetic radiation, later contended: "Radio is a device that transmits and receives voice over considerable distance without connecting wires. Stubblefield invented, manufactured, and demonstrated such a device and did so before anyone else on the planet." However, there had actually been earlier audio wireless transmissions, including, beginning in 1880, the photophone, invented by Alexander Graham Bell and Charles Sumner Tainter, which employed light beams, and Amos Dolbear's "electrostatic telephone", for which it was noted in 1884 that "with this instrument we can telephone, not only without wires, but without even a beam of light".

In 1948, Murray, Kentucky's first radio station began broadcast operations, and in honor of Nathan B. Stubblefield, the owners selected WNBS as the station's call letters. In 1952, his family installed a memorial headstone at his gravesite,

which credits him as the "Inventor of Wireless Telephony, or Radio". The Murray State University physics club is also named in his honor.

In 1991, Kentucky Governor Wallace G. Wilkinson issued a proclamation declaring that Stubblefield "is the true inventor of radio" and proclaimed 1992 as "Nathan Beverly Stubblefield Year" in Kentucky.

And that is his story.

~

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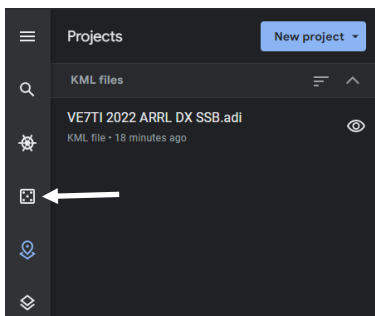
The ADIF processor

Here is something pretty cool!

You can upload your ADIF log file and receive a world map showing your logged contacts. [The ADIF Processor](#) is an online application, created by Mark Wickens M0NOM, that visualizes amateur radio contacts from an ADIF log file using [Google Earth](#). SOTA CSV log files are also supported.

Virtually all Ham Radio Logging programs have the ability to produce ADIF files. ADIF stands for Amateur Radio Interchange Format and was designed to allow logging applications to export and import contacts without losing any information. As such it supports a large number of fields designed to capture every aspect of a QSO.

The processor looks for specially formatted comments in your input file which are transposed into the correct ADIF fields in your output file. The processor also produces Markdown contact lists.



To see your QSOs on the desktop browser based [Google Earth](#), use Import *KML file from computer* via the Projects icon shown at left. Click on the <New Project> icon at the top and import your ADIF file. In Android

Google Earth simply click on the downloaded ADIF file. In a lot of cases you simply select your ADIF file and process it, no other options are required.

You may have connected your logging application to [QRZ.COM](#). If you have an XML Subscription membership contact details can be automatically pulled from QRZ.COM. However, if you use a standalone program such as Fast Log Entry then the data that you enter as part of the QSO log will be the total information available in the ADIF export.

The ADIF Processor will to add information from QRZ.com. Activity references pull are used to locate portable operators and add information about the activity. Using specially-formatted information in the COMMENT field you can populate the correct fields in the output ADIF file. This works really well for Fast Log Entry with only limited support for ADIF fields built into the application.

Above is the result from one of my latest logs in the 2022 ARRL DX Sideband contest. You can see the point of origin is our station in Surrey, BC Canada and the contacts made, primarily to Europe and South America.

~

Page 12—News You Can't Lose

HOW LONG WOULD IT TAKE TO BRUTE FORCE YOUR PASSWORD? 					
# of Characters	Numbers	Lowercase Letters	Upper & Lowercase Letters	Numbers, Upper & Lowercase Letters	Numbers, Upper & Lowercase Letters, Symbols
4	Instant	Instant	Instant	Instant	Instant
5	Instant	Instant	Instant	Instant	Instant
6	Instant	Instant	Instant	1 second	5 seconds
7	Instant	Instant	25 seconds	1 minute	6 minutes
8	Instant	5 seconds	22 minutes	1 hour	8 hours
9	Instant	2 minutes	19 hours	3 days	3 weeks
10	Instant	58 minutes	1 month	7 months	5 years
11	2 seconds	1 day	5 years	41 years	400 years
12	25 seconds	3 weeks	300 years	2,000 years	34,000 years
13	4 minutes	1 year	16,000 years	100,000 years	2 million years
14	41 minutes	51 years	800,000 years	9 million years	200 million years
15	6 hours	1k years	43 million years	600 million years	15 billion years
16	2 days	34k years	2 billion years	37 billion years	1 trillion years
17	4 weeks	800,000 years	100 billion years	2 trillion years	93 trillion years
18	9 months	23 million years	6 trillion years	100 trillion years	7 quadrillion years

A brute force attack uses a trial-and-error method to test possible password combinations until the correct one is guessed and the account can be accessed. Simple brute force attacks try all possible combinations at random or in sequence, one at a time. A dictionary brute force attack uses a list of common words and passwords. Many home routers and devices such as smart speakers, cameras and even thermostats come with default passwords. These can be used to gain access to your entire network, so make sure to change the passwords away from the defaults and use multi-factor authentication when available. If one of your passwords was already breached, a cybercriminal can launch a brute force attack using variations of the known password. This is why it's important to use a unique password for every site.

Our infographic shows how long it would take for a password to be cracked using a brute force attack.

Page 13—News You Can Lose

The Lighter Side of Amateur Radio



How to Fix Anything



WD-40®
3 oz Handy Can

Ultimate Fix-All Kit™
The Perfect Sales Tool!



Another exclusive from



*"People are going to
go crazy for this"*
—Joe, The Joe Show

Plastic Ground Rods

No more rusting or corroded ground rods! Use these plastic ground rods that will last many lifetimes!



- Very flexible and easily conforms to rocks, obstructions, etc. when driving into ground. They just bend around the rocks!
- No corrosion!
- No dissimilar metal issues...because it isn't metal!
- Low conductance.
- Impervious to red ants.



Emergency Comms

Amateur Radio Making A Difference

Part 6 - Disasters, ICS, and Amateur Radio

Tom Cox VE6TOX



INTRODUCTION

Sometimes one or two words is all that is said. Joplin. Fukushima. Pompeii. Fort McMurray. Bhopal. Titanic. Katrina. Northridge. Black Saturday. Lytton. 9/11. Harvey. Paradise. Halifax Explosion. Sometimes one or two words is all needs to be said. Disasters have an impact greater than just the buildings and lives destroyed. They take decades to recover from and change virtually everything in that community and society.

Trust me. You don't want to be involved with a disaster.

It is impossible to have a "great response" to a disaster. People's lives are destroyed, people merely cope, the emotional toll lasts a lifetime, and any heroes are lost in the scale of the Incident. Communities are diminished as many people leave and never come back.

Each disaster is different. What works in one disaster will not work in the next. What occurred was

different than what was expected. You will never know the whole story as it would be impossible to talk to every person impacted, let alone learn everything they went through.

Disasters are not just big emergencies. They are qualitatively different and have certain characteristics that are quite distinct from emergencies. We will look at the characteristics of disasters, look at issues with the Incident Command System, take a look at suggestions for amateur radio in disasters and maximizing our efforts, and consider a few observations from my personal experience.

DISASTER CHARACTERISTICS

Your emergency services are designed for emergencies. These are the regular emergencies that occur in every community on a regular basis. The emergency services are equipped, trained, staffed, and experienced in handling these incidents. While they can ramp up, they can never handle the scale, impacts, or numbers of a disaster.

Tom Cox (VE6TOX) is the Senior ICS Consultant with the Alberta Emergency Management Agency and a Master Instructor with ICS Canada.

He has taught over 400 ICS instructors in Canada, conducts professional development workshops across North America and has written extensively on ICS and ICS instruction.

He received his first ICS training as a volunteer with the City of Vancouver and the Vancouver Emergency Community Telecommunications Organization (VECTOR).

The nature of the response **MUST** change, both to meet the new characteristics of the disaster as well as the changing nature of the response and organization.

Communications Fail'

In a modern world, with almost instantaneous communications through internet, radio, and satellite, the first shock is how quickly and completely communications systems fail. While the mode failures are expected, it comes as a surprise to responders and communities how widespread and complete the failures can be.

When the floods of 2013 hit Calgary and the Town of High River, the internet was down, cell phones were down, satellite phones were scarce and ineffective, and amateur radio was one of the few options. Vince d'Eon (VE6LK) wrote a great article for The Canadian

Amateur² as well as offering some personal observations on disaster response.³

Even when communications modes are working, they are still guaranteed to fail. Commenting on the Slave Lake Wildfire that came into her town in 2011, the Mayor of Slave Lake observed “No communications system in the world is meant for everyone to be on it at the same time.” Cell phone towers were overloaded and responders couldn’t connect. Disasters create a massive demand for information from every person affected, responding, nearby, and interested.

“Seven days after a massive volcanic eruption that spawned a tsunami and ash cloud, communications are still largely down and the scale of the catastrophe unknown.”

Scope

With communications impacted, the next issue will be that the scope will not be known. Responders are trained to slow down and look before going into an emergency scene. You will hear phrases like “Do a windshield survey”, “Do a 360 walk-around” or “The next engine in is assigned to recon”. That never works in a disaster. The impact area of Hurricane Katrina was the size of Great Britain. That’s a long walk-around. Even with satellites and drones, you only get a miniscule part of the picture.⁴

This means that you cannot respond effectively and often miss the hardest-hit areas. Areas with lesser impacts can still yell for help because communications are still working, even if limited. As a result, responders go to the areas yelling the loudest. The 1987

Edmonton Tornado was famous for not realizing the worst hit area was the one area unable to call for help. The majority of fatalities and injuries were at the Evergreen Mobile Home Park but it was a black-hole on the map. It was an hour before a response was sent.

Emergency Services Affected

There are direct and indirect impacts on the response that diminish their capacity. When the tornado hits and destroys the fire hall, it is hard for the fire department to respond. Hospitals flooded, police stations burned,

¹ <https://www.theguardian.com/world/2022/jan/21/diary-of-a-disaster-the-week-that-tonga-went-silent>, January 21, 20

² <https://fars.ca/field-day/how-field-day-became-a-reality-the-story-of-the-high-river-flood-of-2013/>

³ <https://ve6lk.com/about/how-field-day-became-a-reality-the-story-of-how-we-helped-southern-alberta/>

⁴ <https://theconversation.com/disaster-mapping-drones-often-neglect-deadliest-costliest-events-and-hardest-hit-areas-165412>

emergency responders injured. Your Emergency Operations Centre is on fire.

But even if the emergency services are intact, the response may be less effective or completely ineffective. When the water pressure fails during a wildfire, when roads have been dropped ten feet by the earthquake, or when a blizzard has white-out conditions, there may be no response. Secondary issues include lack of fuel, lack of food, lack of sleep, and lack of knowledge of unique aspects of a disaster.

Situation Always Changing

In an emergency, the arrival of the emergency services almost invariably makes things better. almost instantly. Active shooters are stopped, the injured are treated, and people are rescued. In a disaster, the emergency services may be ineffective or even make the situation worse. Part of this is because the situation keeps changing on them.

When the first jet hit the World Trade Center, the emergency services immediately began an emergency response.



While big, the mentality was “this is what we are trained for”.

Responding to hundreds of calls in the World Trade Center and a corporate memory of previous Incidents like a bomber hitting the Empire State Building⁵ resulted in a “can do” response appropriate to a large emergency. But when the second jet hit, the initial response immediately became “inappropriate” in that it would be wrong to continue sending responders only into one Tower when there were now two Incidents. What you were doing one minute ago became “inappropriate” in seconds. But when the reports came in that another Incident had occurred at the Pentagon and another jet was on the way, how do you get your feet under you? Then the tower collapsed. One minute ago, sending people into the two towers appeared to be the best response. Within 120 seconds, the best response became the wrong response.

Fukushima is another example of how impossible it may be to organize an emergency response to a disaster. First you had the earthquake damage. Responders went to the waterfront fires. The tsunami arrived and you had no response as fire trucks and firefighters were swept away. Then the nuclear plant exploded. Then it snowed on the disaster scene. The next day, a volcano erupted. Welcome to a disaster.

Unusual Response

Unusual Incidents require unusual responses. You will do things, intentionally or unintentionally, that you will never do again in your life. In Hurricane Katrina,

The Slave Lake Emergency Operations Centre during the 2011 Wildfire. Photo courtesy CTV.ca.

⁵ https://en.wikipedia.org/wiki/1945_Empire_State_Building_B-25_crash

amateur radio started broadcasting on commercial frequencies. After earthquakes, the San Francisco and Los Angeles fire departments will survey their fire districts before deciding what needs to be done. This means driving past burning buildings and injured children. Helping an injured child when a school two blocks away has more children trapped in a collapsed school with fires starting is not the best response.

In Joplin, Missouri, circus elephants helped clear roads to assist the emergency response.⁶ People are transported to hospital using wheelbarrows, pickup trucks, and police cars. In New Zealand, there was a story of one person taken to hospital by police car. But one quote was from the nurse who rode on top of the police vehicle hanging onto the emergency lights and treating the patient while two people in the car held the ends of the spine board. A small example in a massive disaster.

In Canada's 1998 Ice Storm, a locomotive engine was driven down a street to provide power to a reception centre and community hall. No rails. Not a usual generator.

Think Big

In one disaster, a local fire chief said "We are broke!" I offered to help asking for Provincial assistance. "I don't even know what to ask for!" I suggested either fifty or one hundred million dollars. The look on his face was pure shock. "I can't ask for that!" he said. We ended up asking for fifty million dollars to start, but the actual costs to the town were in the hundreds of millions of dollars. You need to think big, very big.

Because disasters are often widespread, the number of houses impacted can be huge. With housing tight across almost every country in the world, finding hundreds or thousands of houses⁷ is an overwhelming task. Not only do you have to find the actual houses, you may need to carve out a place to put them (High River), get services connected, and prioritize who gets them. As they are intended as a temporary solution, sometimes they don't last as long as needed (think "FEMA trailers" after Hurricane Katrina). Tents don't work in Canadian winters, so more substantive solutions must be found⁸ and they will have more substantive costs.

Pictures of the mounds of debris outside every single home after flooding are common around the world. The debris is massive, mouldy, and contaminated. Just the effort to move it is massive.



Fridges and white goods after the Slave Lake wildfire. Courtesy the Edmonton Journal.

⁶ <https://www.theatlantic.com/national/archive/2011/05/circus-elephants-help-clean-joplin-missouri/351250/>

⁷ <https://www.theguardian.com/australia-news/2022/apr/17/modular-homes-on-way-to-accommodate-new-south-wales-flood-victims>

⁸ <https://www.cbc.ca/news/canada/british-columbia/merrtt-3d-homes-1.6379214>

Volunteers

The shortage of emergency responders immediately results in the need for volunteers. Responders are not used to volunteers, have not worked with large numbers of volunteers, and have no control over the quality of the volunteers.

In last month's massive Australian floods in Queensland and New South Wales, volunteers organized over one thousand rescues in one town alone. But volunteers can be an impediment as well. Pulling guns and beating up people is not likely to endear yourself to people. As well, the sheer numbers of volunteers are guaranteed to overwhelm almost any emergency response. In High River, we were told we would accept up to ten thousand volunteers – with one day's notice.

Without communications or the integration of volunteer efforts into the emergency response, their efforts may be ineffective or misdirected. But integration and coordination of efforts requires resources that the emergency services are already short of.



Things Go Wrong

I once read a report of a tornado response where responders had to drive an additional thirty minutes to get to those needing help because the road was blocked. After awhile, they found the road was not blocked and never had been blocked.

Things go wrong in disasters. Fires jump fire breaks. Saving the homes and letting the lumber mill burn resulted in the town's residents saying "If you had saved the lumber mill, we would have jobs and could rebuild our homes. With no jobs, we have to move away."

The best people can make the best decisions in their entire lives, and it can turn out to be wrong. Welcome to disaster response.

DISASTERS AND INCIDENT COMMAND

You don't know how big it is, you can't communicate, you don't know where the greatest need is, you don't have the resources you need, and you are expected to fix everything that has been destroyed...from schools to tourism, to government. Incident Command begins to break down because disasters are different from emergencies.

I-400

I love teaching I-400 ICS for Complex Incidents. But the curriculum is sanitized and weak. As a result, students come out of it thinking I-400 is "the ultimate" and it somehow makes you an Incident Commander or Area Commander. I put on a series of pictures of recent disasters early in the course. I don't have to show the bodies, but the impact is still understood by every person in the course. This is "Ugly ICS". Disasters are worse than you can ever imagine.

The curriculum has several weaknesses. It presents a number of options but never explains why or when you would use them, what the benefit would be, and (most critically) what the downside will be. As a result, students are left with the impression that these options are easy to do, can be

⁹ <https://www.abc.net.au/news/2022-03-06/nsw-floods-how-a-spreadsheet-became-lifesaver-in-lismore/100885054>

¹⁰ <https://www.gq.com/story/cajun-navy-and-the-future-of-vigilante-disaster-relief>

done in combination with any of the others, and there are no consequences.

Even in a disaster, most of the options presented in I-400 are the last place you want to go – not the first. The best ICS is introduced in the I-300 course and the position-specific training. I-400 is the last place you want to be. That misunderstanding makes I-300 less effective and I-400 more dangerous.

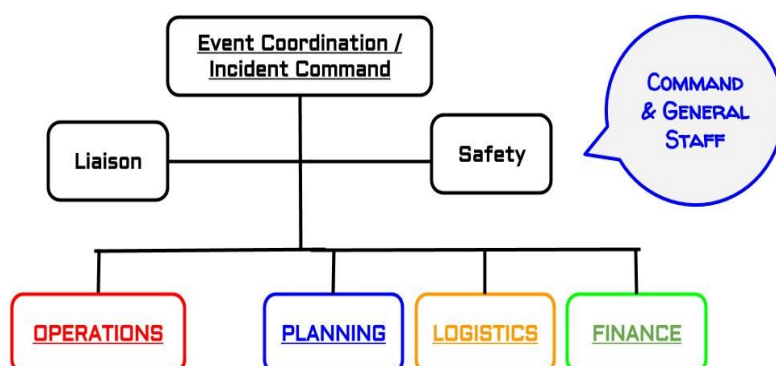
Priorities

ICS was specifically designed for three Priorities: Life/Safety, Incident Stabilization, Property/Environment Preservation. This is an advantage and disadvantage in disasters. They allow you to focus on the three most important Priorities of society, but ignore the fact that there are other priorities. Not only are there other priorities, society may consider them higher than the one or more of the three ICS Priorities.

During the Chuckegg Creek Fire in Alberta in 2019, on community wanted the children's graves protected, even over the houses. In 2013, Calgary was determined to go ahead with the Calgary Stampede, to the benefit of Calgary but to the detriment of some of the response efforts cleaning up after the costliest floods in Canadian history (at the time).

Protection of Government

Even within the three ICS Priorities, there are surprises. Whereas elected officials oversee the response efforts and have the authority, what happens when government breaks down? On a smaller disaster, we couldn't get the State of Local Emergency issued, requests for emergency funding were not signed, public information was lacking, and near rioting occurred in the reception centres. Whether we like it or not, elected officials are critical to emergency response and continuity of government is as important to



Incident Stabilization as pumping water or clearing debris. Look what happened in New Orleans when Hurricane Katrina left the perception that government was ineffective or no longer existed. The response was hampered by an "Every person for themselves" mentality. When did the situation get better? When a National Incident Commander, Thad Allen of the U.S. Coast Guard, was appointed. At that point authority was "restored" and somebody was in charge. Remember, the impact area was the size of Great Britain, so appointing one person in charge does nothing to actually change the physical situation, but it did change the perception of an organized response.

Spontaneous Islands

In the absence of communications, you can only control what you can see. As a result, the emergency response is no longer organized along normal emergency guidelines and practices. Most importantly, both the response and command of the response become spontaneous and unconnected to nearby response.

In the 1995 Kobe earthquake, the Heavy Urban Search and Rescue team only performed a dozen or two rescues. The police, with no training or experience, rescued over one thousand people. With no radios working, roads blocked, and no command, the emergency responders simply

did what they could to make the situation better. They started digging out people with their hands.

Time is required to re-establish communications, understand the scope of the situation, identify the most critical locations and tasks, and obtain sufficient and appropriate response. Until that can be arranged, the response will be ad-hoc, unorganized, and with leaders arising rather than being sent or having authority.

AMATEUR RADIO CONSIDERATIONS

Who Is in Charge?

You need to attach yourselves to the leaders. But when the Emergency Operations Centre is on fire, they may be hard to find. When they are exhausted to the point of complete ineffectiveness, someone else will have taken over. When there are no emergency services, it may be a nurse or construction worker. The leaders need communications to reconnect the “spontaneous islands” of response. They need communications to extend their command from what they can see to how far they can communicate. They need to convey to national or state/provincial governments how bad the situation is and what is needed for the response. You need to be aware of who is claiming to be a leader and who is actually leading. Attach yourselves to them.

Amateur radio can connect people over thousands of miles, but sometimes it is the last few feet that is the hardest. Setting up in the parking lot outside the Incident Command Post or Emergency Coordination Centre is still a communications failure if you can’t reach the person needed in the building.

Where are the black holes?

There is a story of two Canadian Mounties (Royal Canadian Mounted Police) taking a canoe for a look around after a few days in Hurricane Katrina and finding a community

with no response. When the Mounties passed the information over to the state, the state asked the sheriff “Why didn’t you call for help?” He replied “We had no communications. Why didn’t you think that you haven’t heard from a community with thousands of people for over a week?” Then he added the classic line “How can two Mounties from Canada get to us in a canoe before anyone in the state does?” Like any disaster story, it changes to the audience and gets embellished, but the fact remains: It is just as important to know where you haven’t heard from as the areas you have heard from. This may be one of the most valuable roles of amateur radio. A confirmation that any area has not been impacted is as important as any reports of injuries and damage. Reports of “no damage” or “little impact” provide guidance on the exact areas impacted and where the black holes may actually be

Where are the People?

All disaster response eventually comes to the impacts on people. Buildings and the environment don’t care, they just simply exist. People do care. Wherever there are people in a disaster, there will be communications needs. Communicating priorities, communicating distribution, reconnecting people, identifying locations, and making the situation better.

Evacuation centres do not get the information required for people to understand their situation, determine the best and safest actions, and find the assistance they need. Amateur radio isn’t just passing messages. It provides context. How many people are in the evacuation centre? What are the needs? Is any information getting to them and is it posted and made available?

A pet peeve of mine is the Public Information Officer stating how many media briefings they have been given and how many times they have been on TV. If there are no TVs in the

evacuation centre, you have failed to get information to those who need it the most. In one disaster, the government corporate communications people hadn't put out a Frequently Asked Questions (FAQ) list days into the evacuations. People were literally screaming for information (I took some of the calls) and yet it wasn't getting to those who needed it the most. Doing an interview on TV may just be entertainment for most people. Amateur radio should be where impacted people gather and should ensure that essential information is getting to them. If that isn't emergency communications, then what is?

OBSERVATIONS FROM DISASTERS

I have read several thousand new reports and hundreds of after-action reports. As William Lokey, formerly of FEMA, once said, "After awhile it becomes depressing reading the same lessons learned and recommendations disaster after disaster." It seems we don't learn until we have gone through it ourselves (think Covid...). So, I don't offer these as lessons learned, but as observations from years of studying, teaching, responding, and recovering from disasters:

1. If you can't support yourself, you are a burden. When people don't have food, water, or a roof, let alone a bed to sleep on, you are increasing the demands on the already stretched response. Haiti's 2010 was infamous for responders adding to the misery: "Even a medical crew from his own school — Kirsch declined to identify them — arrived in Haiti so ill-prepared they had to seek sustenance from non-governmental organizations."

I bring just enough to carry me through four 3 to 7 days. The longer the stay, the fewer the "luxuries". Disasters are characterized

by an extreme need to reposition resources quickly. In 2005, I was in Edmonton in the morning, by evening I was in Calgary for flooding, overnight I ended up feeding people, the next morning I was sent to Drumheller and by noon we were asked to get food to hundreds of people saving the town. The ability to move your "stuff" quickly is critical to you being used.

One note to consider. If you can't carry it by yourself, you may have too much. I have heard multiple stories of amateur radio operators who had too much gear to transfer vehicles or get into a helicopter (and meet the weight limits). While it is understood that over-preparation is better than under-preparation, the reality is finding an effective balance in-between.

2. Make information usable. The capture of information is not the same as making the information usable to others. Information must be shared others can orient themselves to changes in the situation, identify needs, figure out their role and critical tasks, and in order to brief others.

I mentioned in a previous article how the Planning Section Chief kept on coming into the amateur radio room and taking notes. That's because we were displaying the information we knew. That opened the door to further conversations and identifying what other information was needed, as well as opening his eyes to the connections that amateur radio has with other organizations.

This is multiplied a thousand times over in a disaster. If you are the only source of reliable information or the only location getting or posting regular updates, you will find people will gravitate to you. Even within the emergency response, very few

¹¹ "Disaster do-gooders can actually hinder help", NBC News, January 21, 2010. <https://www.nbcnews.com/id/wbna34958965>

people provide that “overall picture” that helps people orient themselves.

In disasters, you will see Incident Command Symbols spray-painted on roads, search and rescue symbols spray-painted on buildings and cars, and temporary signs spray-painted on plywood sheets. Inside, whiteboards, flip charts, computer displays and even post-it notes have been used to let people know “This is what is going on”.

3. This is emergency communications, not amateur radio. During the evacuation of 30,000 people, everyone puts all their valuables and belongings in their vehicle and drives away. At the evacuation centre, we had break-ins at night into the vehicles of people who had evacuated. There was a lone security guard watching the parking lot, with hundreds of vehicles. As reception centre manager, I asked the guard who she was in contact with if there was any trouble. “I have a dispatcher” she said “until midnight and then I am on my own until 6 a.m.” I didn’t like the idea of her not having any support, so I got a couple of FRS (Family Radio Service handy-talkies) radios and asked the amateur radio operators to be her contact. “We don’t do FRS.” I was furious

When you are at an emergency or disaster, you are there to provide communications assistance, not practice your hobby. You can’t be bothered to assist with keeping someone safe or protecting the valuables of people who have lost their homes?

Amateur radio operators should be amongst the best at emergency communications. You have the skills, phonetics, multiple pathways, message forms, and have trained with multiple organizations on exercises, Field Day, and public events. Not understanding the role of amateur radio during a disaster makes you less valuable to the emergency services, not more.

4. Listen – and do some more thinking. Listen to where the traffic is coming from. Listen for who is not answering. Listen increases or decreases in traffic. Listen to what people need. Then start thinking some more.

If you can’t do everything, look for where you can do the greatest good. If you can’t run 24 hours a day, think about shutting down over night or at certain times of day to catch a nap. There will always be a demand for communications but the question is do you have the capacity. Generally, Amateur Radio is a scarce resource. Any good Incident Commander will put a scarce resource where it does the greatest good, can be the most effective, can be adequately supported, and the resource does not go to whoever wants it first or screams the loudest.

5. Pace yourself – and others. Initial response is a sprint – save the people that can be saved, stabilize the Incident, and restore the community as quick as possible. Too often we put in 22-hour days because it is needed and there is no-one else to do the job. But you can only do that for a couple of days before fatigue and irritability set in. Very quickly, the need for breaks, set work schedules, adequate rest, and to set a good example sets in.
6. This is not your disaster. Most emergency responders and emergency managers during extended Incidents become emotionally attached to the Incident. It is hard to let go. This is not to say “Don’t care!” but to say “Let it go so you can either come back fresh or let it go to others who are fresh.

~ Tom VE6TOX

Watch Tom’s Seattle Emergency Communications Academy presentations at:

https://youtu.be/yGe_mRjsC_M?t=27039

Radio Ramblings

Kevin McQuiggin VE7ZD/KN7Q

Extra-Curricular Amateur Radio



Amateur radio is about communicating, but it is also about learning, experimenting, and the “extension of the amateur’s proven ability to contribute to the advancement of the radio art” [1].

With this philosophy in mind, I thought that I would end the publication season with a discussion of some interesting technologies and ideas which are nominally related to amateur radio, but which are not specifically about transmitting, receiving and exchanging messages amongst ourselves.

The “Amateur Deep Space Network”

We have probably all heard about NASA’s “Deep Space Network” (DSN). It’s a global network of sensitive large radio telescopes which are used to manage spacecraft throughout (and even beyond) the solar system. The network was born in the early 1960s during the “space race” and has provided critical support to both robotic and manned spacecraft for over 60 years. It’s accomplishments and technical innovations are legendary, and it is arguably the most advanced system of its type on our planet [2].





The DSN could be the subject of a lengthy article in and of itself, but for this column I want to describe the amazing results being obtained by a group of amateur radio telescope enthusiasts in Europe and (to a lesser extent) in North America who have created the “Amateur DSN”. Most of the participants are ham radio operators.

The Amateur DSN’s work centres on home-building small radio telescopes which are capable of monitoring space probes across the solar system using their own equipment, independently from NASA and ESA (European Space Agency) facilities [3]. These amateurs have built backyard radio telescopes that are capable of monitoring space probes not only in the earth-moon system, but also solar research satellites in orbit around the sun, and even space probes in orbit of Mercury, Mars and Venus.

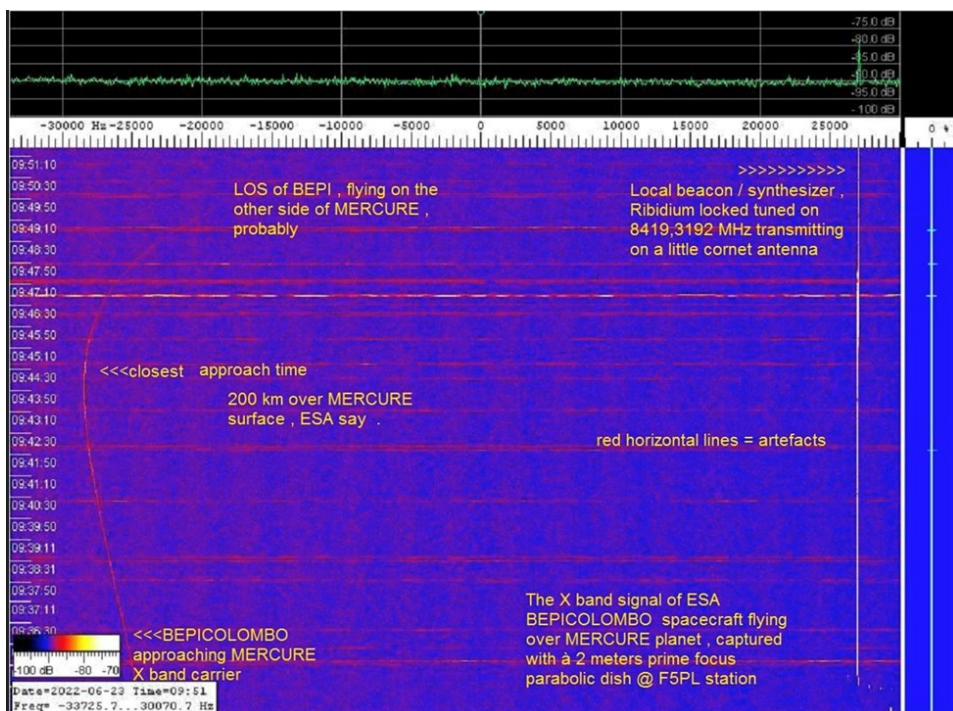


Figure 3 shows an example of a signal received last week from the space probe BepiColombo [4] by Bertrand Pinel, F5PL. BepiColombo is currently orbiting the planet Mercury!

In our high-tech society the complexity of a lot of things that we do and use every day is hidden from the end user. As such, many lay people might think that building such a sensitive radio receiver would be easy, but it is not!

Imagine the huge path loss that must exist between our planet and another planet in the solar system.

I have used a couple of columns this year to discuss my new EME station and the challenges of minimizing system losses, due to the incredibly high path loss of signals to (and from) the moon, at a total distance of about 800,000 kilometres. As we all know, radio signal strength falls with the square of the distance between the sender and receiver; for the moon, the Earth-Moon path loss is greater than 200 dB.

The average distance between Earth and Mercury is between 77 and 222 million kilometres [6], or about 193 to 555 times greater than the distance between the Earth and the Moon. The path loss is about 277

Figure 1 [top] – NASA 70-metre Diameter DSN Antenna [19]

Figure 2 [middle] – N2QG’s 2-metre Diameter Amateur DSN Antenna [20]

Figure 3 [bottom] – Carrier Received from BepiColombo, in Orbit Around Mercury [5]

dB. The technical difficulty of building a receiver which can recover these incredibly weak signals at such distances is very high.

Nonetheless, Amateur DSN members have had considerable success in monitoring several space probes at Mars, Venus, Mercury, and even in deep space.

I think that this work is very interesting, and it would be an interesting challenge to put together a station that is capable of receiving extremely weak signals of this type. The challenges would include maximizing gain, minimizing system noise, and likely finding a very quiet location for the station well away from the RFI of modern life. This would be a complex project.

While not falling directly into the category of “amateur radio”, such experimentation is nonetheless quite relevant to the hobby. Who wouldn’t want a receiver quiet enough and sensitive enough to receive signals from a space probe 200 million kilometres away?

A New Project

My new 1.2 GHz EME station is performing well. With the latest results from the Amateur DSN (ADSN) project in mind, I started thinking about whether I could utilize the new parabolic antenna to perform experiments similar to those of the ADSN.

I did some research on NASA’s web site [6]. I decided that a good target for reception is the Lunar Reconnaissance Orbiter (LRO), currently in orbit around

the moon on a scientific mapping and photographic mission. The LRO has a telemetry channel at 2271.2 MHz that uses a common form of modulation called BPSK [8]. It transmits about 5 watts into the spacecraft’s high gain antenna at a relatively low data rate. This signal should be easily receivable from Earth.

My 2.4m EME folding parabolic antenna is capable of receiving signals at 2271 MHz. All that is necessary is to change the “feed” at the focus of the antenna. If I can design a 2271 MHz feed [9] then the antenna should easily receive signals from the LRO. I have a good SDR receiver [10] with a maximum RX frequency of 6 GHz, so I can use that device for this project.

I have just about everything I need, and it sounds like a good learning opportunity. I will start by trying to see the signal from the LRO telemetry channel on a waterfall display. If that step is successful, then I will be able to use the gnuradio open-source software package [11] to recover a bitstream from the orbital probe. Then it will be really nice if enough information on the LRO bitstream is available from NASA to allow decoding of the spacecraft’s telemetry. I might be able to see some interesting health and housekeeping data from the spacecraft. This won’t be “classical” amateur radio”, but it will certainly be fun!

Reception of Submarine VLF Signals

Another field of interest for many hams that does not meet the definition of classical

amateur radio is reception of VLF (Very Low Frequency) signals intended for submarines in the service of various militaries around the world. VLF is also used for other purposes such as geophysical studies, and RF frequencies below about 100 KHz are populated by very high-power signals that can be received tens of thousands of miles away. Some of the military VLF stations transmit 1,000,000 watts!

Reception of these signals is possible using a device that just about every amateur radio operator has in their shack: a personal computer with a sound card.

How could a computer’s sound card be used to receive radio signals? This may seem counterintuitive, so let’s explore it a bit.

Modern sound cards can sample audio input from a microphone at 96 KHz. As we may remember from our amateur radio experience, a sampling rate of 96 KHz can reliably detect signals at half this rate, or 48 KHz [12]. There are plenty of radio signals at 48 KHz and below that would be interesting to monitor.

But this sounds like a “disconnect”: sound cards sample audio from microphones, not radio signals. Aren’t these different things?

The answer is no: audio signals from a microphone are translated by the microphone into alternating current signals that travel down the microphone cable to the computer sound card, where they are processed. Straightforward!

However, if, instead of a microphone, we attach an antenna to the microphone input of the computer, RF signals up to 48 KHz in frequency will be sent to the sound card where, despite their different origin and format, they will be processed by the sound card and digitized as usual.

The digitized RF can then be analyzed, displayed, or processed by popular sound processing applications. The bottom line is that the computer's sound card can be used as a radio receiver for signals up to 48 KHz. Neat!

Many hams are using this approach to monitor things like encrypted communications being sent to submarines at frequencies around 24 KHz. The signals can be detected, but they cannot be decrypted: the detection is the point of this project, not decryption. The hams' objective is to put together a receiving system that can receive such signals; the content of the transmissions is irrelevant.

This is another example of interesting experimentation and research which is being conducted by hams, but is not "classical" amateur radio.

SETI: The Search for Extraterrestrial Intelligence

The final example for this month is far-removed from "classical" amateur radio but nonetheless has many aspects which are closely related to the amateur service's goal of advancing the

radio art. The search for extraterrestrial intelligence (SETI) has evolved from what was viewed as a fringe activity in the middle of the twentieth century to a respectable field of scientific study today.

Many respected academics and scientists with well-recognized qualifications are now involved in seeking the answer to what they call the "The Big Question": Are we alone in the universe?

Governments, private foundations, and top tier academic institutions are funding this research, and new fields such as "astrobiology" are now well-established and involved in experiments and analysis of observations from planetary probes, optical and radio studies of other stars, and the detection of exoplanets: those planets orbiting other stars in our galaxy.

An excellent compendium of papers and presentations from a SETI conference sponsored by NASA in 2010 reflects the maturity of this field. Edited by Professor Douglas Vakoch, it is called "Communication with Extraterrestrial Intelligence". See

https://www.amazon.com/dp/1438437943?psc=1&ref=ppx_yo2ov_dt_b_product_details

Many of the scientists involved in SETI are amateur radio operators, and although amateur radio does not play a direct role in current scientific research, many SETI researchers are also hams. There is arguably a similarity in mindset between

the curiosity that drives amateur radio operators to invent new technologies and discover new characteristics of radio, and the search for an answer to "The Big Question".

Let's go into a bit of detail.

A) Life Elsewhere in the Universe?

Given the vastness of the universe and the apparent uniformity of physical laws across space and time, it is not unreasonable to assume that life in some form has arisen elsewhere in the universe. As Professor Carl Sagan put it, "The universe is a pretty big place. If it's just us, seems like an awful waste of space" [13].

Then again, we have only one example of a planet where life has evolved. There may be other examples forthcoming: Mars is known to have (and have had a significant amount of) water, and while life (or fossilized life forms) has yet to be found, there is a fair likelihood that, in the least, the "red planet" was once home to simple life in a form similar to that of early life on Earth. Scientists theorize that life may exist, or have existed, on several other bodies in the solar system as well, such as Jupiter's moon Europa. Forthcoming space probes such as NASA's Europa Clipper [15] will investigate whether this is the case.

Detection of life (either extant, or in a fossil record) on another planet would represent a key point in human history, but in

regard to SETI, the question is whether that life has evolved to be intelligent.

Intelligent life will set itself on a path similar to that which occurred on Earth, one which led to early humans: the development of sentience (self-awareness) and an understanding of the malleability of the environment. This understanding leads to technology: the development of tools and processes which, when extrapolated for millions of years, may lead to the development of an advanced civilization such as our own.

One must remember that the existence of intelligent life does not imply the existence of radiocommunication technology. Intelligent life may develop aquatically or in some other physical form which does not support the development of physical sciences and related technologies. Some SETI research is looking instead for “biomarkers” of life (and technological civilizations) emanating from distant planets. Biomarkers are those chemical signatures of life that may be detected spectroscopically in the atmosphere of a planet.

Life may be commonplace, but the SETI radio search is focused on self-aware, intelligent life and depends on the existence of a technologically based society. In our frame of reference, it is plausible (and probably likely) that any technologically advanced society will have discovered electromagnetic waves, and from there, radio: if

so, their signals may be detectable here on Earth.

Let’s focus on detection of extraterrestrial radio signals for our short discussion today. There are a few factors which might affect our ability to do a “radio search” of nearby stars to detect extraterrestrial radio signals.

B) The “Search Space”

There are many questions that need to be answered in SETI. A key one is: how many intelligent, technologically advanced societies that use radio are there in the universe? This would comprise our “search space”.

The galaxy contains billions of stars. Not all stars will harbour planets, and most of these planets appear unlikely to be suitable for life, at least as we know it. While intelligent life may be detectable through interception of radio signals (the classical focus of SETI), the development of radio communication by a technologically advanced society may not be a “given”.

Over 5,000 exoplanets (planets orbiting distant stars) have been detected since the first one was detected in 1991 [14]. Based on what we know of life forms on Earth, SETI research is currently focusing on that subset of exoplanets which exist in a star’s “habitable zone”: those planets not too close to their star (which will probably be too hot for life), and not too far away (too cold). The habitable zone around a star supports the possibility of liquid water existing on the planets

within that zone. Water is believed to be a requirement for life.

SETI researchers are using spectroscopic techniques to identify those exoplanets which have a spectral signature suggesting that they contain water. The “search space” of exoplanets for SETI is thus limited to that subset of exoplanets which are in their stars’ habitable zone, and which contain water.

C) Advanced Technological Societies

Life may exist on many worlds, but it is likely that only a small percentage of these planets contain intelligent life. Intelligence does not necessarily lead to the development of advanced technology. Life may be intelligent without necessarily developing radio or any other form of engineering or technological expertise. This further restricts the search space. The precept of SETI’s radio search implicitly limits itself to detection of advanced technological societies.

D) Usage of Radio

How many advanced technological societies are there which have developed radio technology?

If we are to detect extraterrestrial intelligence by intercepting their radio signals, then the extraterrestrial society must have developed radio or telecommunications technology. As noted in C) above, there might be many intelligent societies in the galaxy which we

will never discover using a SETI radio search simply because these people [16] did not develop radio technology.

There are several other critical questions in relation to a SETI radio search:

- Where should we point our deep space receivers?
- On which frequencies?
- What kind of signals should we look for? [17]

At this point we need to consider modulation schemes and communication protocols that may be imprinted upon extraterrestrial signals that we will receive.

Basic schemes like CW, AM and FM may be expected because they are relatively simple in form and straightforward to implement. Therefore, they are (possibly) likely to be adopted by all new users of radio in any extraterrestrial civilization, like they were in our own.

Much as our early radio signals (currently 90-100+ light-years from Earth and propagating outwards fast...) consist of broadcasts of “Tarzan”, “Amos n Andy”, and “Adventures of Gracie”, perhaps we could expect early radio from other civilizations to be of similar form (and of likewise dubious quality).

As radio technology evolves, it also seems logical that digital modulation schemes like BPSK, QSPK (binary and quadrature phase shift keying) and their extensions would likely be adopted by any technologically advanced society. The

development of information theory and computers seems, to us, to be logically linked to the development of radio and electronics. We should look for these signals as well.

However, many advanced modulation schemes (see the cornucopia of modulation schemes described at the “Signal Identification Wiki” at https://www.sigidwiki.com/wiki/Signal_Identification_Guide) number in the hundreds and differ in all manner of their parameters. Detection of these signals (and worse, their decoding) at interstellar distances would be extremely difficult.

D) Bandwidth and a Signal’s Power Density

The higher the data rate of a radio signal, the broader the signal’s bandwidth [12]. In higher bandwidth modes, the transmitted signal energy is spread out across a wider range of frequencies. For example, a 5 -watt FT8 signal will occupy only 50 Hz (5/50 or 0.1 watt per Hertz), while a 5-watt 144 MHz amateur FM signal (which contains the same amount of energy) will occupy 30 KHz (5/30000 or 0.00017 watts/Hz).

Noise degrades every signal, and a signal with greater bandwidth at the same power level (i.e. a lower power density) will be affected by noise to a greater extent than a narrower signal. At the profound distances between stars, signals with higher bandwidth will have much lower power densities and be significantly harder to detect. A mature technological civilization

using radio is likely employing higher bandwidth to achieve higher data rates (think of ourselves in this regard), and this will make it much harder to detect these signals at distances measured in light-years.

A civilization purposefully transmitting a high-power narrowband signal in our direction could potentially achieve a detectable power density at our antennas, but the chances of such a directed transmission, and us intercepting it, are probably not high.

E) The “Window Problem”

Further to the challenges already discussed, we need to consider the “window problem”. What is the average lifespan of a technological civilization? Once life evolves towards intelligence and this leads, in a small percentage of cases, to the development of advanced technology such as radio, how long does the use of radio as a communications technology persist?

It may be that an advanced society evolves to discover mathematics and physics and that this knowledge leads to discovery of radio, but that the “radio phase” of the society only lasts a short time before an even better communication technology is discovered. The society will then, of course, abandon radio and adopt the new and superior technology. Wouldn’t we do the same if a new communications technology, one superior to radio, was discovered here on Earth?

More pessimistically, a civilization's discovery of physics and engineering may soon lead to the development of mass-extinction weapons such as nuclear warheads. Jealousy, politics and rivalries between nations could result in creation of nuclear stockpiles such as we are experiencing here on Earth. If the speed of technological advancement exceeds the evolution of peoples' social and interpersonal maturity, socially immature civilizations which possess these weapons may make terrible mistakes. Use of these weapons could lead to the destruction of civilization on a global basis.

Perhaps advanced technological societies always eventually destroy themselves due to such emotional immaturity, but we can only hope that this is not the case.

In either scenario, the "window" of time where an advanced society discovers and uses radio may be very narrow. In our frame of reference, maybe only a few hundred years.

In terms of a SETI radio search, this means that, in addition to the physical and evolutionary constraints already discussed, we will be looking to intercept radio signals that were only emitted for a couple-hundred-year (our frame of reference) period. This adds a temporal component to the detection problem.

What are the chances of these extraterrestrial signals making it to Earth, and into our sensitive receivers just when WE are also in the narrow technological

"radio window" and happen to be looking for them? We can only hope that we are looking in the right direction at the right time, with the correct detection capabilities, in a mutual time window when both the extraterrestrial civilization was transmitting, and when we are listening.

There is an additional constraint.

Radio signals from distant stars can take eons to reach us. The universe is 14 billion years old and galaxies, stars, solar systems and planets have been forming and dying throughout what physics believes is about 12 billion years of that period.

A radio-using technological civilization that evolved one million light-years from Earth will have transmitted those signals well before the development of modern humans. "Their past" has to coincide with "our present" for us to receive those signals. If those signals had reached Earth in 73 AD, or even in 1850, then there would not be any radio receivers here on Earth to receive them.

F) Undiscovered Modes of Communication

We are somewhere in the middle of our own "usage window" for communication via electromagnetic (EM) waves. We have been "doing radio" for about 140 years and there is currently no sign of this usage stopping. But are other non-EM types of long-distance communication possible?

For over one hundred years, science fiction writers have devised all sorts of communication modes that ignore the "speed of light" constraint on EM wave propagation, but these methods are fictional ("subspace", anyone?) and no physical or theoretical basis for them seems to exist. It would be nice to talk with "Starbase 7", 25 light-years distant, in real time, but as far as scientists know right now, this is not possible.

If, however, physics supports some advanced form of "super luminal" (faster than light) communication mode that we have not yet conceived of, then this will impose yet another constraint on the likelihood of us being able to detect extraterrestrial signals. An advanced civilization with access to "super luminal" communications would likely move all its telecommunications to this mode once it is discovered. The radio spectrum emanating from this civilization would then fall eerily quiet, and our own SETI efforts (should we survey this exoplanet) would come up empty.

G) Summary

That's a lot of information! Let's summarize the challenges and constraints.

The probability that radio signals from a distant exoplanet hundreds of light-years away [18] will reach us:

- Just when we are looking in the proper direction;

- At a civilization that is using EM waves for their communications;
- On a particular frequency;
- With a spectral power density that is detectable;
- At a time when a technologically advanced society capable of radio transmission was using radio (in their own “radio window”); and finally
- When the propagation delay between Earth and the distant planet causes the extraterrestrial signals to arrive here on Earth and be received during our own “radio window”

may be very, very slim.

Nonetheless, the search is intriguing, and is worth trying!

Detection of extraterrestrial radio signals, and by extension the fact that another intelligent, technologically advanced society exists elsewhere in the universe (or at least, one that did exist in the past) would represent a pivot point for humanity and our collective civilization.

Learning that we are not alone (the answer to “The Big Question”) would change the course of human history. It would give us a new perspective on

ourselves, our conflicts, humanity’s diversity, and allow us to start to think about our place in the universe. This knowledge would change our own future in ways that would be hard to predict.

What we would learn from this detection would challenge many long-established beliefs (for example, religious mythologies) but confirmation of the existence of intelligent extraterrestrial life would be of significant long-term benefit to humanity. The several ongoing exoplanet and radio search projects are worthy of scientific and societal support.

Conclusion

These non-amateur radio projects are nonetheless very interesting and of relevance to our day-to-day ham radio activities. It is good to keep tabs on projects such as the Amateur DSN and on developing scientific issues and new technologies. I hope that you found the topics covered interesting!

The several SETI projects which are underway globally are certainly not “amateur radio”, but the motivational foundation of these projects, which is centred on curiosity, seeking answers to fundamental questions, problem solving, and the desire to learn more about the universe is commendable and in keeping with the overarching goal of amateur radio to “advance the state of the radio art”.

That’s it for Radio Ramblings for the 2021-2022 season. See you in the fall! Feedback on this article can be directed to the Editor, or directly to me at mcquiggi@sfu.ca. Thanks for reading!

73,

~ Kevin VE7ZD / KN7Q



References:

- [1] Title 97 of the US Code of Federal Regulations, Part 97.1(b) as discussed in McQuiggin, K. W. L. (2004). *Amateur radio and innovation in telecommunications technology* (dissertation). National Library of Canada.
- [2] *Big Dish: Building America's Deep Space Connection to the Planets*, by Douglas J. Mudgway. University Press of Florida, 2015.
- [3] The Amateur DSN's discussion board is at <https://groups.io/g/Amateur-DSN>.
- [4] NASA's web pages describing the international BepiColombo mission are at <https://solarsystem.nasa.gov/missions/bepicolombo/in-depth/>.
- [5] More screenshots in the thread at <https://groups.io/g/Amateur-DSN/message/6240>.
- [6] The Earth - Mars distance varies from 54.6 million to 401 million kilometres, given that both planets are orbiting the Sun. Average distance is about 225 million km. See <https://www.space.com/16875-how-far-away-is-mars.html>.
- [7] "List of Active Solar System Probes", https://en.wikipedia.org/wiki/List_of_active_Solar_System_probes
- [8] BPSK transmits one symbol per bit of information. It is described at https://en.wikipedia.org/wiki/Phase-shift_keying.
- [9] A 2271 MHz feed is available from the antenna company, but it will be more interesting to learn how to design my own.
- [10] An SDR transceiver from Ettus Research in the US that is able to receive and transmit signals from 100 KHz to 6 GHz. See <https://www.ettus.com/>.
- [11] See <https://www.gnuradio.org>. I have discussed gnuradio before in this *Radio Ramblings*. It allows you to "design" receivers and transmitters using a simple graphical user interface (GUI).
- [12] This is called the Nyquist-Shannon sampling theorem. If you sample a signal at any frequency at **twice** that frequency, then you will get a proper representation of the signal that can be demodulated or further analyzed. A sound card running at 96,000 samples per second can accurately detect audio signals from a microphone up to 48,000 Hz in frequency. In our present discussion, this means that RF signals up to 48 KHz can be detected by the sound card. See https://en.wikipedia.org/wiki/Nyquist%E2%80%99s_sampling_theorem.
- [13] <https://www.goodreads.com/quotes/282727-the-universe-is-a-pretty-big-place-if-it-s-just>
- [14] See https://en.wikipedia.org/wiki/Lists_of_exoplanets and "How Many Exoplanets Are There?" at <https://exoplanets.nasa.gov/faq/6/how-many-exoplanets-are-there/>.
- [15] <https://europa.nasa.gov/>
- [16] I use the term "people" because I think it is appropriate for anyone who is a member of a technologically advanced society anywhere, either on Earth or elsewhere! If your society is smart enough to develop language, tools, fire, science, radio and other advanced technologies, then "people" is a good enough description of these folks for me!
- [17] The question of "when" is also relevant, and will be discussed briefly later.
- [18] Certainly civilizations may have existed on planets millions of light-years from Earth or even further, but the practicality of detecting these signals is very, very low. SETI radio searches have tended to focus on exoplanets in the hundreds of light-years or closer to Earth as the signals will be much more easily detectable.
- [19] From <https://www.nasa.gov/archive/directorates/heo/scan/services/networks/dsn>.
- [20] See http://www.prutchi.com/wp-content/uploads/2020/10/DSN_Lessons-Learned_N2QG.pdf

The Contest Contender

RAC Canada Day 2022 John Brodie VA7XB



We were recently offered the callsign of VE7RAC for this contest and decided that we would take it on. Any Canadian callsign ending in “RAC” earns double points for the other station so the expectation was that activity would be brisk. The contest is only 24 hours long and to fill the hours we needed at least 6 operators each with shifts of 2-4 hours or more. Dino VE7NX, Thomas VE7TXL, Sheldon VA7XH, Les VA7OM, Slawa VE7LLW, John VE7TI and I (VA7XB) took on the challenge.

As Canada Day was only 4 days after the end of Field Day, we made use of our 100’ “Bigfoot” tower which had been moved to the OTC a week earlier and was left in place for this event. The beam was pointed SE and left there for the duration of the contest. Since it is not reported elsewhere it is worth mentioning that the day before Field Day, the generator which powered the electric motor for raising and lowering the tower failed when the tower was about at 2/3 of its fully raised position; we couldn’t raise it and we couldn’t lower it.

Some quick diagnostic work by Steve VE7SXM, Gord VA7GK and Bill VA7PFP determined that no power was coming from the generator as a result (apparently) of a broken drive belt in an inaccessible location. Lack of power was remedied by patching in

Top to bottom: John VA7XB working his early morning shift, Les VA7OM worked both CW and phone, and John VE7TI who worked the last hours of the contest. Despite some technical glitches the contacts were plentiful on both CW and sideband..

110v supplied by several lengths of extension cord from the OTC. Success, albeit slower than usual movement of the tower drive motor due to the voltage drop across 150 ft. of extension cord. So we were back in business giving us the TH7 tri-bander for 10-15-20m bands along with the multi-band off-centre fed dipole for 40-80m raised to the height of the tower.

For this contest we opted for one radio, the IC-7610 and the Expert Linear 1.5. The operating schedule was set up to alternate CW with SSB in order to maximize our presence over both modes and all bands (except 160m). At 0000 hrs UTC Thursday, Dino hit the road running on 20m and deep pileups began immediately. He was followed by Thomas VE7TXL on SSB and later by Slawa VE7LWW who stayed all night on CW, experiencing some slow times in the early morning hours.

I relieved Slawa at 0530 and continued on 40 and 20m until Sheldon showed up at 0700 hrs. Later, a couple hours after Les started his shift back on CW it happened - a sudden jump in swr on the TH7 yagi suggesting a major problem. It was quickly determined that the fault was not in the feedline or connectors but at the antenna 80 ft in the air. Too late in the day to take it down for a check, so Les switched over to the multi-band wire which allowed him to continue on 20m. John VE7TI finished off the remaining hours on 20m SSB.

Tomorrow we take down the tower and wire antenna and look to repairs of the generator, as well as determine the problem with the TH7 beam, which may simply be a connector issue or possibly a failed balun. Fortunately, we have a spare balun in inventory and can change it out easily if that is found to be necessary.



*Right from the top:
Dino getting back into contesting after being away for a while, Our 100+
foot tall 'BigFoot' mobile tower set up outside our training station.*

Several of the operators mentioned that there were more US than Canadian stations and they made contacts with the South Pacific, Europe and Japan, some off the back of the beam or via long path. 1172 contacts, not bad!

~ John VA7XB

RAC 7/01/22 - Operator by Band Statistics

Operator	3.5	7	14	21	28	Tot
VA7OM	0	0	51	137	4	192
VA7XB	0	4	74	0	0	78
VA7XH	0	0	112	63	1	176
VE7LWW	45	112	6	0	0	163
VE7NX	0	0	226	0	0	226
VE7TI	0	0	132	0	0	132
VE7TXL	11	163	31	0	0	205
Total	56	279	632	200	5	1172

We could have used some of this



Contest Online ScoreBoard



02 Jul 2022 02:27

Closed: RAC Canada Day

Go

Highest rate: 217

M/M HP		Score	QSO
1	W1VE	850,196	2,052
M/S HP		Score	QSO
1	VC7X	693,908	1,383
2	NJ4P	622,640	1,234
3	VE7RAC	361,088	1,172
4	VA2RAC	303,120	1,514



Social Reminder

The Saturday weekly social gathering is once again 'on' at the Denny's Restaurant, 6850 King George Blvd., Surrey BC from 07:30—09:30. All are invited. Afterwards, we will host workshops and will be available to invigilate Amateur Radio exams at the OTC, 5756—142 Street, Surrey from 10-noon. Bring your ham issues, our Elmers will try to help you sort them out.

Daniel Romila VE7LCG

Daniel's Workbench



To build or not to build?

We welcome Daniel back to The Communicator. Daniel is a prolific experimenter with many project articles to his credit published here previously. This, and future issues will bring even more. —Ed.

Many of my projects are made for fun and do not have any practical application. This means I do not need to compare the cost of what I do with the cost of buying something already made and I am limited only by what I can afford.

In an exchange of emails with Alvin Austin VE5XAM from Saskatoon he wrote me that they have a new repeater in the area, this time with tone, which would eliminate some radio amateurs because of their old transceivers, which have no tone capability.

This forces the question “To build or not to build” something for adapting the old transceivers. It already went down the path of “To partially build or simply let it down?”

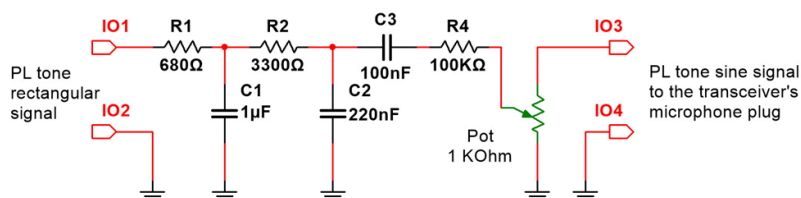
In a previous article “A PL Tone Solution For Older Transceivers” published in “The Communicator” in February 2018, page 48 I described how one can add tones to old

transceivers through minimum effort, either by connecting it to a computer, which would run a tone generator (sine) application to the microphone input, in parallel with the microphone, or by connecting to a PWM (pulse width modulation board) which would generate rectangular signal. Used by itself the PWM module/board would introduce some “bruum” in the background, but it would definitely work as is, with any CTCSS tones, with minimum annoyance.

The 5V rectangular PL tone can be transformed into a sine with the following circuit that I drew in the Multisim 14 computer Windows program. Similar versions can be found all over the Internet. The output potentiometer is connected in this



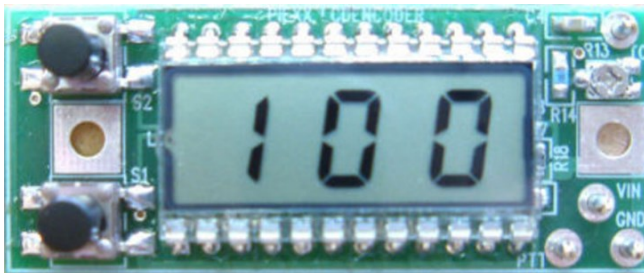
way because it is in parallel with the transceiver's microphone. Adjusting the level of the input voltage of the PL tone to the transceiver should not interfere with the microphone level and - of course - not to put the microphone at ground (which would be possible if the pot would be put in a more "apparently natural" configuration).



PA3GUO answered the question about building or not building such CTCSS encoder by designing and building an Arduino based project. The rectangular shape is rounded into a sine signal with the above electric circuit.

http://www.pa3guo.com/PA3GUO_Arduino_CTCSS_v1.2.pdf

Many other people answered the question and said, "Built it", for example <https://github.com/tczewonka/arduino-ctcss> which also went down the Arduino path.

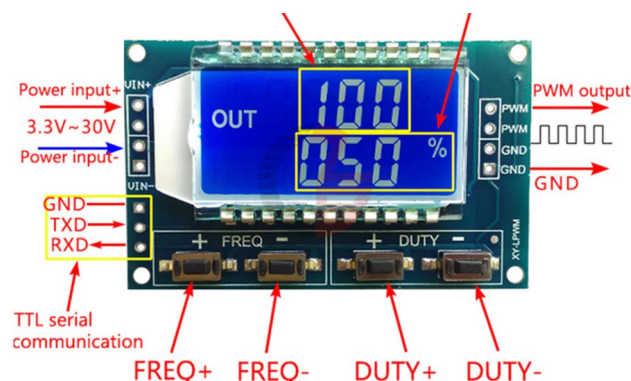


The answer "build it" makes a lot of sense comparing with buying a pre-made CTCSS encoder such as that from PIEXX which on ebay.com costs US\$69.99 plus US\$49 shipping.

That astounding price is comparable with buying a new modern transceiver in June 2022 and forgetting about any wiring and modification of an old transceiver.



After several emails, Alvin Austin VE5XAM went down the path of "partially build", by buying a PWN generator board, with display and button, power suppliable from 3 V to 30 V, for around C\$3 (shipping and taxes included) and wiring it to the old transceiver.



A "hard core" electronics designer and fast prototyper like myself would ask why nobody builds everything in hardware, with dedicated integrated circuits for generating CTCSS, like the MX-315 (FX315) and a 1 MHz crystal.



The price of such a circuit is C\$44 for two pieces. To build or not to build... or is it better to buy a new 3-band Baofeng UV-5R walkie-talkie, which in June 2022 is around C\$35 (shipping and taxes included). The lowest price for such a toy was C\$27 (shipping and taxes included), if you can wait for a sale event. Should I spend C\$50 to build something that I do not really need or should I buy another walkie-talkie to put on the

shelf, which would also double as an FM Radio, even catching the Bollywood music FM broadcasts?

But let's abandon the problem of PL tone generating and come back to the general question "To build or not to build?" and emphasize the money constraint that affects the answer of a passionate builder.

The source of inspiration for many radio amateurs who want to build their own toys are old schematics, published in the 1970 - 2000 era, when things were built and repaired. Who is paying a repair shop today to repair his/her TV? It's cheaper to buy a new one.

The main problem with such old schematics is that they contain old components which might still be in production today, but at a high price. For example, what kind of RF preamplifier builder is someone who does not build with BFR91A transistors?

OK, I confess I was one of those suckers, as you see from my project below, simulated in Multisim 14. I said sucker because if I want to buy one piece of BFR91A in June 2022 I'd pay C\$3.50, shipping and

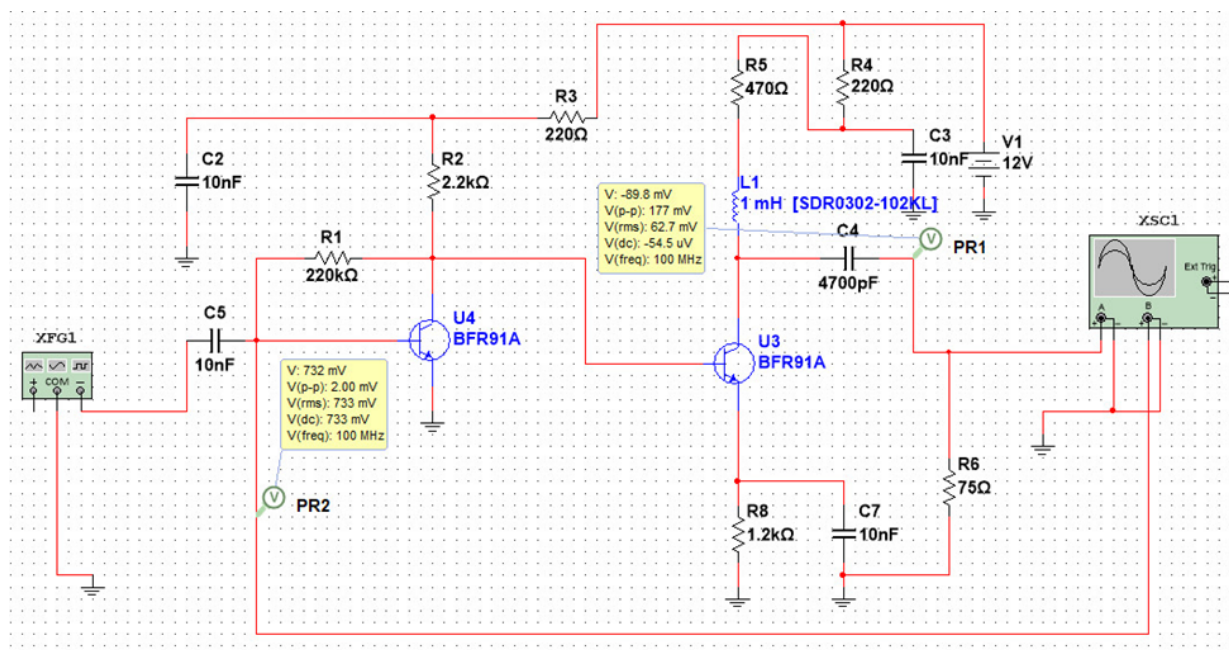
taxes included. The situation is not much better if I buy 5 or 10 pieces, because the price is still around C\$2 a piece. C\$2 for a transistor in 2022 is something... Well, everybody says BFR91A has very low noise, correct? 1.6 dB at 800 MHz.

Unfortunately, because there is no longer the great abundance of schematics in the last few years (when nobody builds anything anymore - LOL) it is difficult to find that a 2SC3355 has 1.1 dB noise at 1 GHz, and in June 2022 costs C\$2.50 for 50 pieces, shipping and taxes included.

So, the lack of information creates a vicious circle, which makes the answer "NO", the most probable answer to the question "To build or not to build". It is exactly like 'the fewer licensed radio amateurs that are out there, the fewer licensed radio amateurs there will be' - the same vicious circle.

~ Daniel VE7LCG

Note: An extended version of my February 2018 article from "The Communicator" of adding PL tones to old transceivers was published in May 2020 in URE on page 17. It is not available online and it is in Spanish.



...more

Daniel Romila VE7LCG

Daniel's Workbench

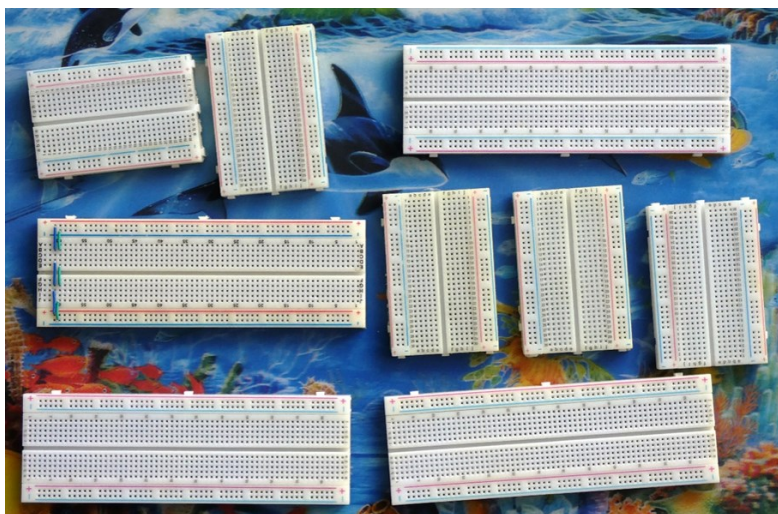


Dedicated prototyping boards for soldered components

If you are a passionate ham radio project/electronic projects builder like I am, you seldom start with a printed dedicated PCB. I need to simulate and optimize the schematics on computer programs. After I get at a reasonable schematic, I need to put it on a breadboard and use signal generators and an oscilloscope. Breadboards are a nice and cheap method to re-use components for many projects. They have some limitations because of contact issues and because of parasitic capacitance between adjacent lines of

contact (6 pF). Still, I was able to build an entire analog FM 88 - 108 MHz radio on breadboard with no problems (*see my article from Radio ZS from April 2021, pages 33 - 36*).

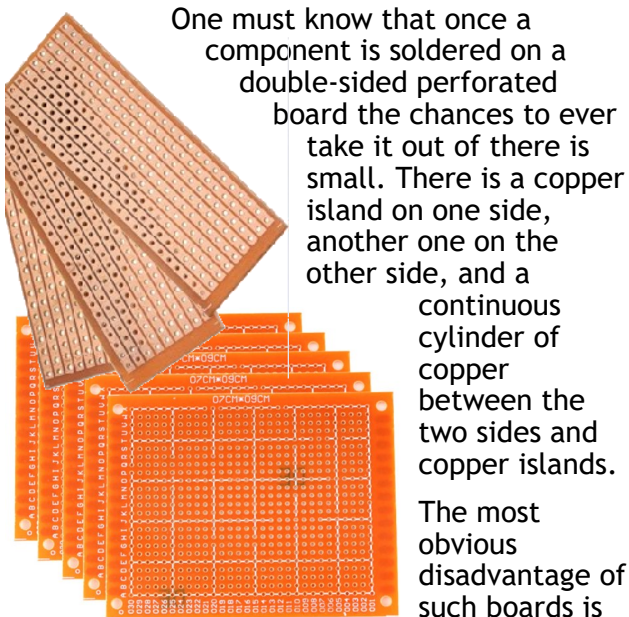
I make the electrical connection between components with the built-in matrix of the breadboards, but also with dedicated wires that I decided to buy ready-made and cut at different lengths. Some breadboards have continuous horizontal power supply lines (blue and red), some have them interrupted at the middle of their length.



This is confusing, because I have both types, and many times I extend my project on several prototyping breadboards.

Nothing is worse than building a precision VFO and having the components on the breadboard moving every time there is a mechanical shock on the table on which the breadboard is located. One solution is to buy perforated single sided or double-sided copper boards on which to solder the critical parts of the project.

They come in various sizes and shapes. They have continuous lines or just copper islands around the holes. All of them assure a solid mounting and connection of devices - different than on breadboards - these must be soldered.



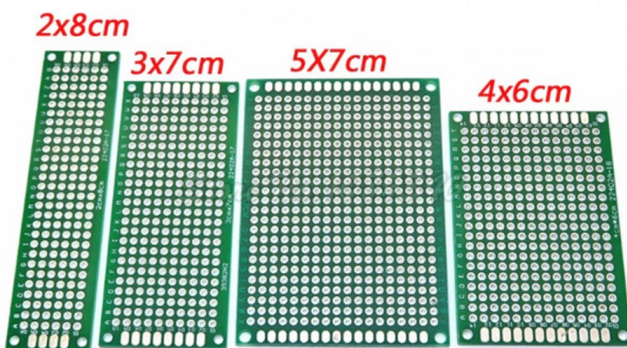
that they are not reusable. One puts the components on them, solders the connections between the components and the project is built. Maybe the components can be taken out and reused, but the boards themselves are no longer what they were. The single sided perforated boards are notorious for losing the copper islands around the holes after one or two times heating with a solder gun.

I wanted to have a more space and the possibility to re-use such boards for projects. I became very fast in building and soldering big projects - it comes with experience. I can also keep in mind schematics with hundreds of connections and components, datasheets, pin positions, which also comes with experience and with keeping that experience, even as I age. I want to re-use the boards, and I want to re-use the components. The answer was to design my own prototyping boards for soldered versions. I tried to buy something ready-made, but nothing met my needs, which are the needs of most amateur and professionals in electronics engineering/ham radio projects. Instead of searching further for such boards and eventually finding them, I decided to make just two of them, two separate types, to immediately solve the problem.

My choice of starting boards was the 10 cm by 15 cm ones, double sided. At the end of May 2022 one could buy five such boards from the Chinese websites for around C\$11 (shipping and taxes included). For example from:

https://www.aliexpress.com/item/32513942645.html?spm=a2g0o.productlist.0.0.263c3ffbTZrQON&algo_pvid=b9c2ba0e-2162-4079-9dea-2ed097de35ef&algo_exp_id=b9c2ba0e-2162-4079-9dea-2ed097de35ef-1&pdp_ext_f=%7B%22sku_id%22%3A%2257430089909%22%7D&pdp_npi=2%40dis%21CAD%21%219.6%21%2111.76%21%21%40210318be16537650535667755e0078%2157430089909%21sea

The first board I made has squares of copper islands all over, except the upper and the lower power supply strips. I used a ruler and





knife for digging into the copper to the plastic substrate:

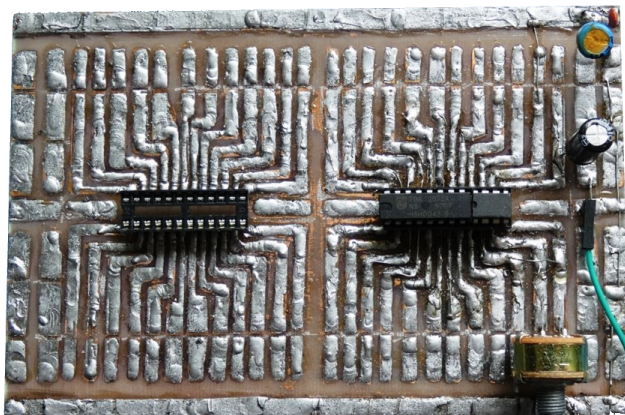
The lower left corner was drilled through, and I soldered a wire on both sides, to have the ground back plane connected to the GND strip line from the working surface. Such squares do have capacitance between the planes, and this is OK: many of my projects end up as Manhattan style builds, which have exactly those capacitances between the soldering islands and supporting ground plane.

I verified with an ohmmeter that there was no unwanted electrical connection between adjacent squares and strips. I added solder on all of them, for easier future soldering of electronic components. While many authors recommend bending the terminals of the components and soldering some full lengths of terminals on the copper island, I never do such a thing on testing boards. I put more solder and the components' terminals remain in vertical position, without bending. The components stay on the board simply because there is so much solder that it floods the terminals by several millimeters. This allows an easy extraction and reuse of the components afterwards, without overheating the copper islands and risking detaching the copper from the plastic substrate. It is a temptation to make those square islands

smaller, but please think what it is comfortable for your vision, your hands and also for not having copper detach from the test board. So, too small square islands are not good. One can use two attached test boards if necessary. No need to overcrowd a test board. Overcrowding defeats the purpose of testing, adjusting and fine tuning. You can see a 6 crystals ladder filter on my board.

The second board I made was different. I use various integrated circuits, and I was thinking of planting several sockets for such integrated circuits. It is totally useless to plant IC sockets on a test board if one does not allow enough space around them. There is a contradiction between having many various sockets on the board and having enough space around the sockets for soldering components.

I mostly use radio integrated circuits which have a lot of pins. For example, MC3362, a double conversion analog superheterodyne



has 24 pins. A microcontroller ATMEL328 has 28 pins. I have decided that I will work with totally separated microcontrollers, not on the same test board with analog integrated circuits, so 24-pin sockets would be enough for me. 28 pins would uselessly crowd my board and I would eventually end up having a test board with only one socket. LM386, a final audio amplifier has 8 pins. I use them a lot.

I made a kind of spider web structure around each 24 pins integrated circuit socket. The spider web has islands, so I can use this test board even for projects not having any integrated circuit in them. The previous square island test board would be more suitable for such purpose, but having choices is nice. If I use a radio IC and I decide to add a transistor amplifier stage, I can do it.

I made this second board with traditional painting and corrosion. With a pencil I first drew everything, and after I was happy with my drawing, I used a permanent marker. The back surface was completed painted with nail polish. I did not use any template, because I never use them. All my projects are one of a kind, and I draw my PCBs directly on the PCB itself, no intermediary step. It comes with experience, and it stays with experience.

As you can see in the next close-up, the 24-pin socket allowed me to put an integrated analog single conversion AM superheterodyne



TDA1072 together with a final audio amplifier LM386. There is even room enough for the potentiometer, ceramic filters and LC tuned circuits.

The ground plane is again connected to the upper GND strip through a hole and a wire soldered on both sides. Verification with an ohmmeter is a task that takes some time, but it is safer than just visual analysis.

My life as amateur builder improved a lot after making those two boards. It takes me less time from having the idea to practically implementing it, having it function and fine tuning. I found that frustration with unstable mechanical connections can extinguish the pleasure of an electronics builder. And let's say it out loud... many electronic builders do not need what they build at all. It is just answering the questions "what if?", "why not?" and so on. Ham radio building is an intense mental exercise that can keep the brain young. My article shows how I got to spend more time on the pleasure of building and thinking instead of troubleshooting unpleasant mechanical contacts. As somebody once told me, one has to have the tool(s)!

~ Daniel VE7LCG



...more

Daniel Romila VE7LCG

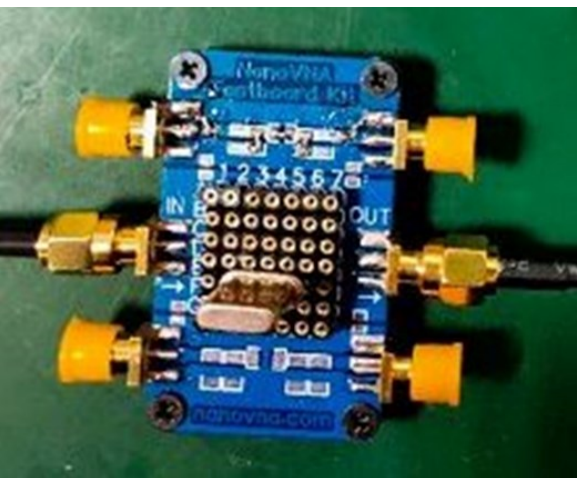
Daniel's Workbench



A NanoVNA test board for crystals and filters

One of the reasons I bought a NanoVNA (SAA2 v2.2 in my case) was to be able to build and test RF filters, intermediate blocks of antenna preamplifiers and yes, to select and measure the parameters of quartz crystals, build and test crystal ladder filters and other small projects with crystal and ceramic devices.

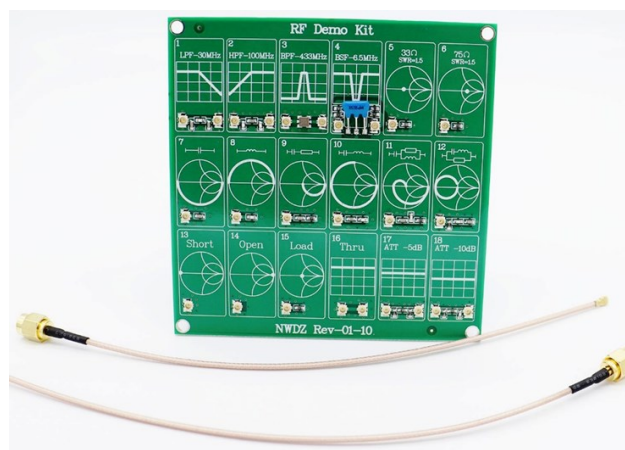
There are some test boards for sale online, but they did not answer my need. For example:



This board looks nice and it would be a solid version for measuring the parameters of a quartz crystal, one at a time. But there is not enough room for a 6 crystal ladder filter. Anyhow, from here I got the idea that a kind of breadboard structure would be

the best for me, for building lattice and ladder crystal filters.

Another board for sale online is dedicated to learning some RF concepts, and it is more suitable for technical colleges and very simple experiments, not for complex ham radio projects:



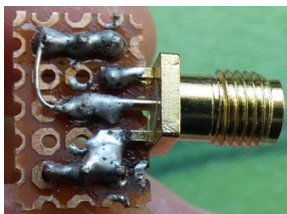
All that being said, I was left to my own devices. Here is what I finally did *[photo top right next page]*...

So, if it is to be breadboard, let it be breadboard. Of course, using a breadboard will require calibration on the breadboard. In the picture above you see some black jumper cables ready to be used for the “through” stage of calibration, while the yellow ones are ready for measuring a single crystal.

I selected 50 Ohm resistors from my bin with 47- and 51-Ohm resistors and added to the original calibration set, to make the calibration on the breadboard instead of doing it at the connector on the NanoVNA.

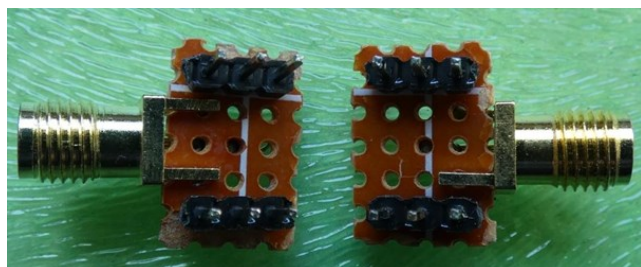


I started by getting two SMA female connectors that can be mounted on a PCB.



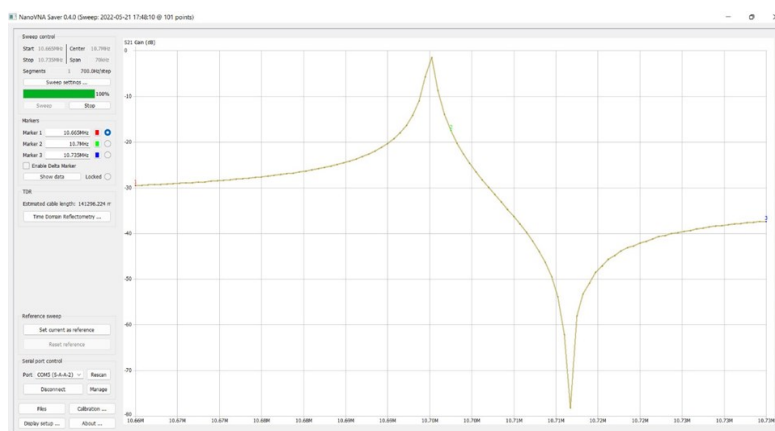
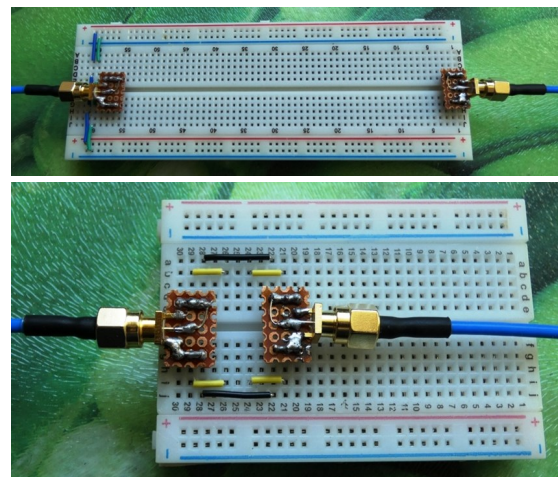
I mounted them on 2 small pieces of perforated PCB. I paid attention that one has to be connected to the right side of the breadboard, and one to

the left side of the breadboard, so the two pieces of PCB with pins and connectors are not identical and not interchangeable one



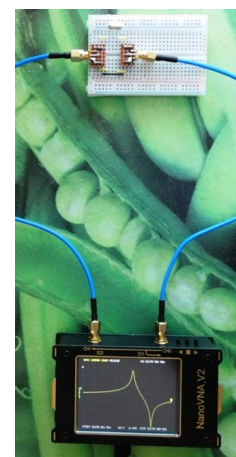
with another because the ground would be either up or down on the breadboard.

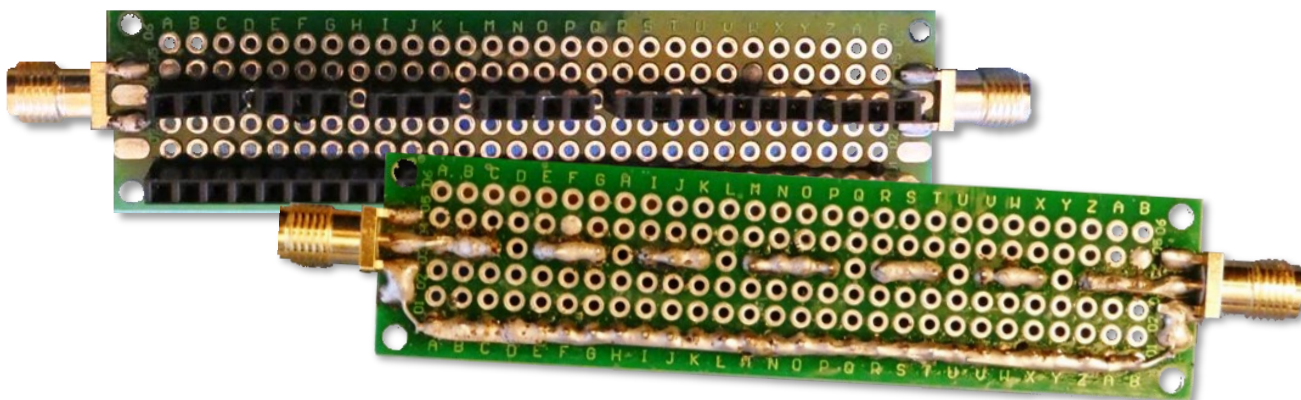
I connected the NanoVNA to a Windows computer running NanoVNA Saver. I set the range between 10.665 MHz and 10.735 MHz. I did all the steps of the calibration only after setting the range, and saved the calibration on the computer in NanoVNA Saver (I want all possible points of the future graph to be inside the useful interval of frequencies).



Just for the sake of showing that it works, here is the NanoVNA in standalone mode, with the calibration done on the breadboard, but this time done on the NanoVNA screen itself and stored on the NanoVNA itself:

One must keep in mind that the capacitance between two adjacent pads in a breadboard is around 6 pF. The crystal occupies at least 3 holes, with one covered by the body of the crystal, so the parasitic capacitance is $6 \text{ pF} / 2 =$





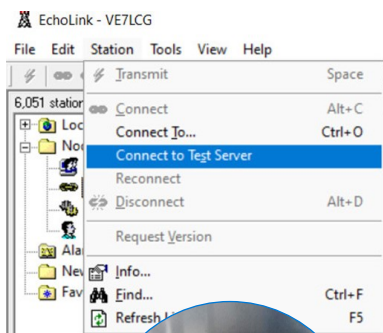
3 pF. The terminals can be spread further apart and components placed in holes with wider spacing, so the parasitic capacitance can become negligible. Anyhow, it is something to keep in mind when building filters on the test breadboard and moving them onto more permanent PCBs.

I also built a stronger test board on a double-sided perforated PCB, but up to now a calibrated breadboard solved all my project interests.

~ Daniel VE7LCG

A desktop PC microphone preamplifier for EchoLink

I was using an old desktop PC for EchoLink. It has audio microphone inputs and USB ports. Everything was fine until I used USB headsets, then I was always told my audio signal is weak. So, I said I would go with the analog inputs. When verifying with the EchoLink test server the signal was too low.

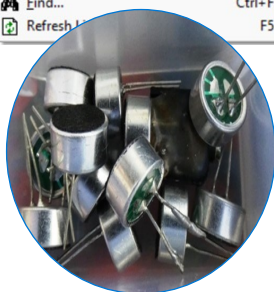


This did not discourage me. I was looking in my bin of toys and I found a bunch of electret microphone capsules.

The computer input plug for a microphone also has a voltage supply (3.9 V in the case of my computer). I quickly put together a microphone with a connector in the back, ready for a male-to-male audio cable:

As expected, the microphone was good enough for all the applications I had in the computer, except for EchoLink. It was not practical to boost the volume and adjust everything to maximum in the operating system. What I needed was just a 3 - 5 times amplification. I practiced some schematic drawing and simulations in Multisim.

The final schematic I decided to play with is shown [next page top right].



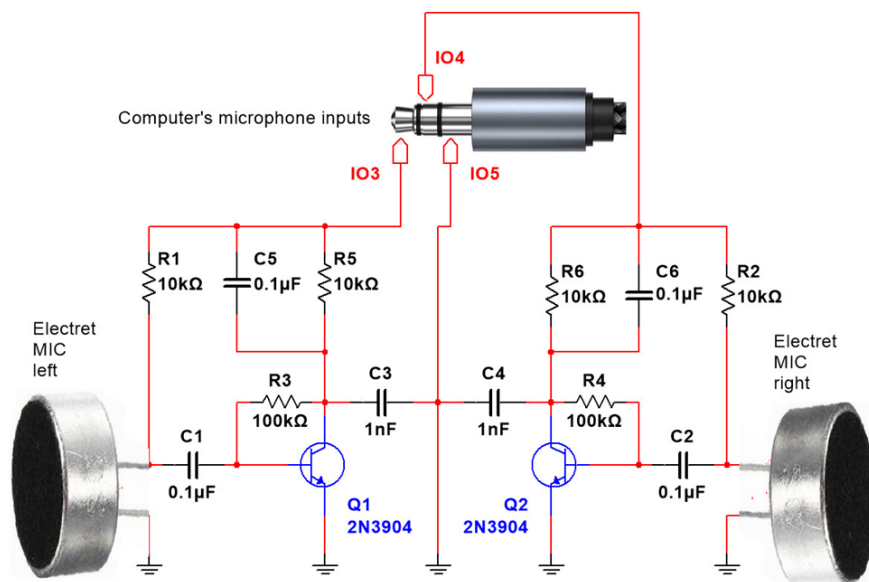
Multisim allows the introduction of pictures into the schematics, so I put the pictures of the microphones and of a male audio jack, just to make everything clearer. The amplifier does not need an external power supply. There is around 3.9 Volt on the male audio jack when the amplifier is not connected (as only the measuring voltmeter consumes current from there) and 2.2 Volt when the preamplifier is connected and functions.

I emphasize here that the above schematic is correct, and that the audio output AC must be connected together with the DC power supply in the jack. Separating the two AC and DC paths and power supplied from USB or external power did not bring any improvement either in amplification nor in clarity.

I used simple bipolar transistors that are easily found, 2N3904. Any other NPN would work. I paired the electronic components from the left with the right channel, by selecting the resistors and the capacitors. This is useless for EchoLink, where a mono version would do, but I decided to do something cute.

And since this project was a kind of a necessity without being a big one, I played with it first on the breadboard, to verify on the oscilloscope that everything was fine and to fine tune the preamplifier.

The values verified in the Multisim simulation were already the best. While there is a big temptation to put a hundred or so picofarad capacitor immediately after the microphone to eliminate any eventual radio frequency signal from the air/computer noise, this totally killed the microphone, so it did not work. After amplifying the microphone with one transistor stage I could put 1 nF to ground, which made the signal very nice and eliminated any



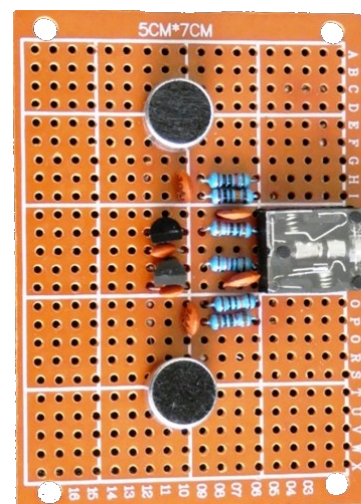
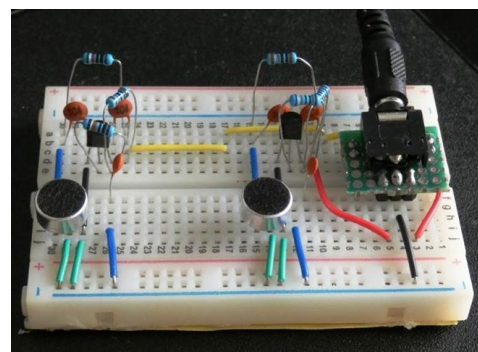
harshness. I verified recording and adjusting the capacitors in the operating system's recorder. After promising results EchoLink also accepted my new microphone assembly. It provides just 3-to-5-time amplification.

The 2N3904 NPN transistor works fine at 2.2 Volts. I tried to do a version with a 2N7000 MOS-FET transistor, with the idea that the amplification would be bigger. It did not work at 2.2 Volts. I supplied power separately and it did not amplify more, but collected noise due to the high impedance and high resistor values it requires for bias

So I moved forward and placed the project on a perforated board.

I use it. I am not such a frequent user to put the preamplifier and microphones in a box, but it would be a nice and simple permanent solution.

~ Daniel VE7LCG



...more

Daniel Romila VE7LCG

Daniel's Workbench



An open sleeve 3-band antenna with telescoping elements and one cable connection



Many radio amateurs live in apartment buildings. Some were used to having access to big antennas in big places but were forced to downsize and now have problems even hitting the local repeaters and participating in net meetings. Using a portable walkie-talkie with its own rubber duck antenna is a desperate solution. Stepping outside the building is not always possible.

So, while something like a Baofeng UV-5R walkie-talkie (3-bands in its last versions) would do, the antenna would not do for maintaining a “social” radio amateur life.

To keep things peaceful and respect the building rules, the antenna must not to be seen from outside. One coax cable is easy to install, three of them would be a difficult task and using a triplexer would be expensive and again add complexity. I decided to make a dipole antenna, connected with a single coax cable, and to use the ‘Open Sleeve’ concept. I put two elements in front of the coax connected dipole element, but there are no electrically connected elements tuned for the other two ham radio bands. The final construction was made from telescopic antennas, and looks like this:



The main dipole is connected to the coax cable. I had 10 meters of RG58 cable, terminated with SMA connectors, as needed for my Chinese triple-band walkie-talkie. Verify what kind of connector you need for the specific model of transceiver you have. It is the same price if you buy only the cable or the cable with connectors - at least it was for me when I bought it from the Chinese website.

The whole construction starts with finding a sweet spot on the balcony, but such sweet spots can be found even inside the apartment on the walls. I had several, but I still decided to put the antenna outside. My dipole was built from two telescopic antennas screwed on a test dual sided perforated PCB. I found it strong, and good for the majority of my projects. Just do not try to unsolder an electronic component soldered on such dual sided perforated PCB (LOL).

I want to emphasize here that finding a sweet spot for the antenna to hit the wanted repeaters is the most important thing, more important than the SWR values (anyhow related).

I placed the original single band dipole on a side wall of the balcony. I made the main dipole from telescopic antennas, long enough for the lowest frequency band I intended to use, in my case 144 MHz. So, the main dipole is the longest dipole of the three that the final construction has. One can stop at just two bands or use the same concept for four bands.

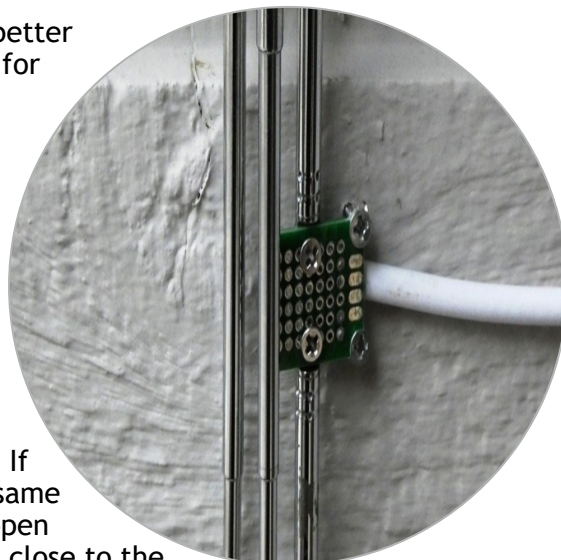
I verified antenna performance for the whole 2-meter band, and it worked. I fine-tuned the elements, by shortening or extending the telescopic antenna elements. The dipoles have a total length of 950 mm for 144 MHz, 595 mm for 220 MHz and 298 mm for 432 MHz. At the end of the article, I will give those final lengths again, tuned for the 2-meter, 1.25 meter, and 70-centimeter bands. To my surprise, the optimum lengths for one band do not much influence the optimum lengths of the other dipoles.

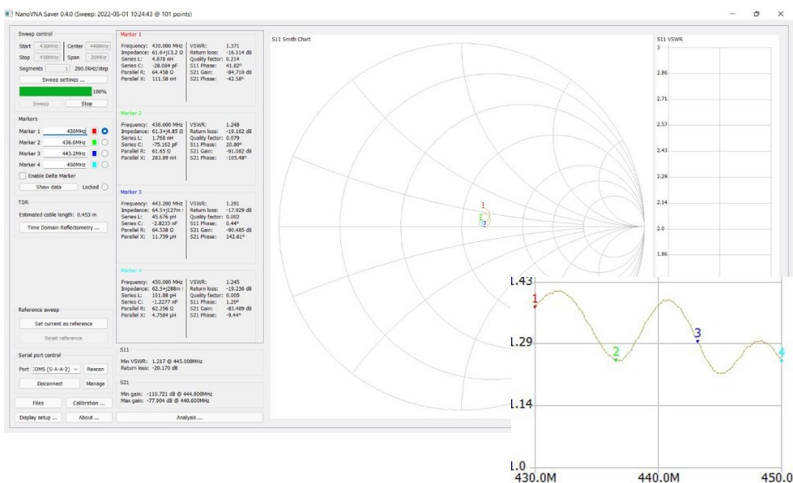
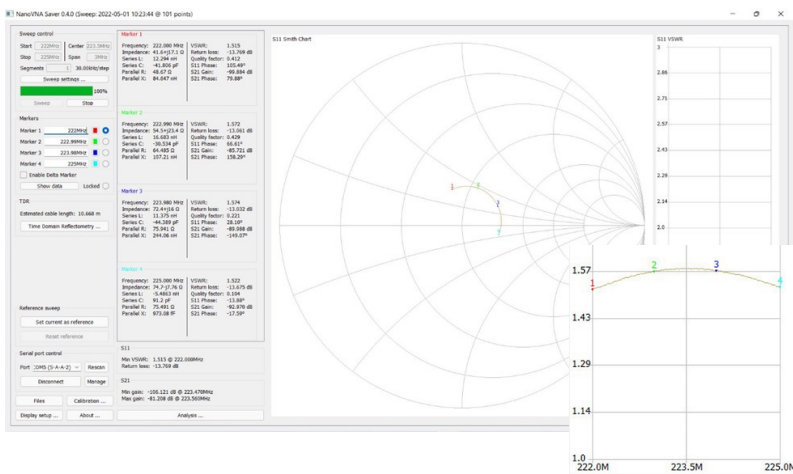
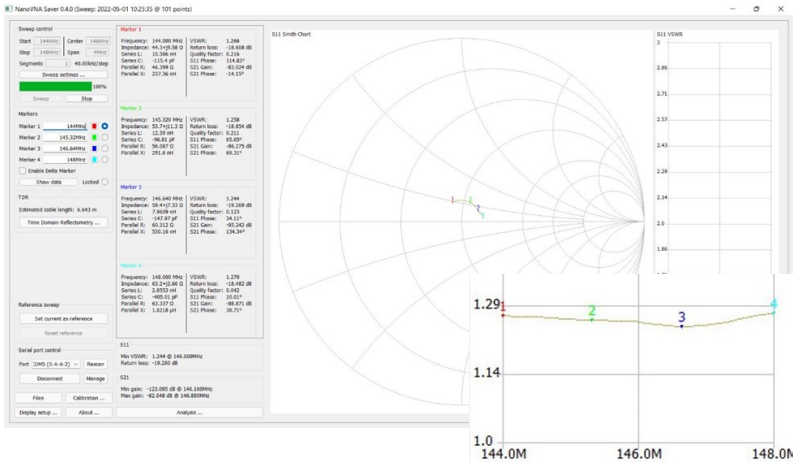
After the main dipole worked, was solidly installed on the wall and the cable was put in its final position, I started to add the open sleeve elements. This time I made each dipole from one single telescopic antenna since it was not necessary to separate them in two or fasten electrical connections. I installed them on the wall, and you can see in the picture an idea of how to mount them.

You might find better suited solutions for your particular situation.

The three dipoles must be isolated from each other. I found it easier for my construction not to put all three dipoles in the same plane. If they are in the same plane the first open sleeve would be close to the main electrically connected dipole and the next open sleeve element would be further away, so less connected electromagnetically, which will translate into a loss of power. Anyway, keep in mind the open sleeve antennas have some loss of power. It did not make any difference for me - I hit the same repeaters as with a tuned dipole, but electrically connected only with an open sleeve element, connected just electromagnetically, in close proximity of a main dipole tuned for another band.

I fine-tuned the three-band antenna with a NanoVNA SAA2, version 2.2. I used a computer screen to have a bigger image and to be able to take screenshots for this article. I connected the NanoVNA SAA2 with a USB cable to the computer and I used the program called NanoVNA Server. Since I have Windows 11, I can no longer use NanoVNA QT program.





If a computer program is used for NanoVNA the calibration has to be done with the NanoVNA connected to that program, on the computer and stored on the computer. A calibration made on NanoVNA, when used independently, has no value for the program and cannot be used.

I used the calibration procedure from the NanoVNA Server program and stored the calibration data on the computer. It is better to first decide the sweep range needed, for example 144 MHz to 148 Mhz for the 2-meter band, and execute the calibration after the frequency edges were already entered. Please see how to use the NanoVNA Server program, or the program of your choice, or simply the NanoVNA independently, if you have it but do not want to use a computer.

144-148.cal
222-225.cal
430-450.cal

The purpose of this article is the antenna description, not NanoVNA software. I'll just mention here that I limited the measurements to the ham radio bands because the measurement points are spread from the band start to the band stop frequencies. I want to have as many measurement points as possible inside my useful range, not outside.

The results are shown on the right.

SWR was under 1.26 for the 2-meter band, under 1.59 for the 1.25-meter band and under 1.40 in the 70-centimeter band. The last open sleeve element, for the 70-centimeter band can be omitted, but in that case the SWR would have bigger variations inside the band. The same with the impedance. You can see in the last graphic that my placement of the 70-centimeter dipole was not exactly symmetrical, due to the wall constraints.

The open sleeve element method can be an easy way to add the 220 MHz band to an existing 144 MHz dipole. Telescopic antennas permit easy adjusting for best SWR if you have an antenna tuning instrument, like a NanoVNA.

I also tried three electrically connected dipoles, each one made from two telescopic antennas. The SWR and loss values are better for three electrically connected dipole antennas than for the open sleeve method. For low power (less than 50 Watts) using a triplexer is not justified and increases the losses. But that is not the subject of this article.

Just as a note, the computer programs allow the display of precise SWR values, with several decimals. Do not believe anything after the first two decimals. If you obtained something too close to one, like 1.009, it means the computer program is way beyond what the NanoVNA tool is capable of, whatever version you use, but especially what the first version of NanoVNA knows to measure. Look in the tool specifications. Remember that the measurements are not done continuously in the ham radio band, but only at a limited number of frequencies. The same happens with the calibration, so you already have an idea about reading the SWR values with three or more decimals.

It is important to establish the frequency range first and perform the calibration after, but that only partially compensates for the limitation of NanoVNA, with a limited number of points of measurement, only 101 if the NanoVNA is used independently. This is totally insufficient for adjusting a repeater, because of the limited dynamic range and because of the probability of getting the best tuning of filters exactly between two adjacent NanoVNA measurement points. You will never be able to see and never be able to get to the optimum for that filter/repeater.

As promised, I'll repeat the optimum lengths I found for the three dipoles, so readers can quickly find them when eventually trying to build this antenna. The dipoles have a total length of 950 mm for 144 MHz, 595 mm for 220 MHz and 298 mm for 432 MHz.

~ Daniel VE7LCG

Vibroplex Acquires SPE Expert Linear Amplifiers

Vibroplex LLC, of Knoxville, Tennessee, has entered into a purchase agreement to acquire all operating assets related to the sale and servicing of SPE Expert linear amplifiers from Expert Linears America LLC, of Magnolia, Texas. This is including contractual agreements for the exclusive sale and service of SPE Expert amplifiers for the United States and Canada. Our SARC amplifier is from SPE, which is based in Rome, Italy. Vibroplex has taken over the exclusive US and Canada distribution and service of SPE Expert products effective May 1, 2022.

Present ELA LLC owner Bob Hardie, W5UQ, told ARRL, "I'm still doing a lot of the repairing, and I will be for a few years until I just can't repair anymore." All SPE amplifier warranties presently in effect will be transferred to and administered by Vibroplex.

*Bob Hardie, W5UQ, and Elva Hardie, KG5HIE, of Expert Linear Amplifiers.
Bob Hardie will continue repair SPE Expert products following the company's purchase.*



Yes, I have a walkie-talkie and no, I am not the security guard

Daniel Romila VE7LCG

I live in an apartment building with the balcony having a free view towards the South. I am at 103 meters above the sea level, which gives awesome radio opportunities. But the hill continues behind the building, so it is possible to have even better conditions, and reach repeaters even further away.

So, I took my walkie-talkie and went up the hill, to Higher Mountain Park. I was launching a CQ when somebody came up to report to me those nasty children were spray painting garbage bins. I expected a 59 report, not a painting report. I said I do not want to be involved, and the complainer went away disgusted. Another guy acted erratically some 50 meters from my location and another person came to complain about the intoxicated guy. It seems that having a walkie-talkie in hand guarantees my success for socializing but does not give me time for radio activity. I tried to explain that I am not the right person to talk to, but I was immediately asked:

Are you the security guard or the local drug dealer?

I am the best, came my very strong answer, which made this person go away, too.

A group of people nearby gathered and started to throw rocks towards me. I felt it was easier to run than to stay and explain what a radio amateur is, what he looks like and what he wants.

Being so unsuccessful in my first attempt I felt something must be changed. I was thinking that maybe my rubber duck stock antenna made me look small and confused with a common guy instead of instantly being recognized and admired as a radio amateur. A longer, better, stronger antenna like the telescopic RH-770 was the answer to all the problems. I mounted it on the walkie-talkie and went uphill, this time to Bali Lake Park, where nobody was (yet) upset by my presence.



I extended my antenna. Very long and impressive this telescoping antenna. 91 centimeters long.

This place is taken!

I moved away.

That place is taken, too!

I was between fishing rods. I tried to explain that what I have is a walkie-talkie with a long telescopic antenna, not a



fishing rod, and that I have an earpiece. I tried to explain that I am licensed. I passed exams. I have documents and look; look what nice equipment I have.

Take your gizmo and go! Wait for your turn.

It is very sad to be told my turn in life is not now. As many radio amateurs have pointed out, almost all problems come from the antenna. Not enough space. Trying to hide it. Trying to show it off and fights with another radio amateur nearby increasing the power. And so on.

Life is not fair.

I was thinking that maybe a more obvious antenna, something home brewed would make me more visible as a radio amateur. I was thinking of a tri-band dipole antenna put on top of my walkie-talkie that would make me stand out of the crowd. The radio performance would be better, too.

I took an SMA connector, soldered it on a double-sided perforated PCB. Above the connector I put three layers of dipoles, each one for a band and I shortened the dipoles' arms - the left arms, all of them, and the right arms, all of them, I separately the left group from the right group.



I used telescopic antennas, extended them (the dipoles lengths: 94 cm for the 144 MHz band, 70 cm for the 222 MHz band and 38 cm for the 70 cm band) and in no time, with the help of a NanoVNA everything was tuned with nice SWR. The practical tuned lengths vary significantly from what the online calculators calculate, by several centimeters. You can repeat my described construction eventually and play more with the tuning, and you will obtain an even better result. I was anxious just to see it work somehow and go out.

I went out again. I do not even dare to tell you where, because I am still using this place. Like an intellectual I took out of my pocket the piece of paper on which I wrote down up to

what length to extend each of the six arms of the dipoles. I used a measuring tape, taken from another pocket.

Finally, people stopped and paid attention to me. I felt a wave of admiration coming from them. Children surrounded me and their mothers took pictures. Teenagers took video with me and posted it everywhere on the Internet. A fairy came, went 360 degrees around me, measured me from head to toe and left. I think the fairy was one of my neighbors. I live in an adult only building. She might be a fairy, or she was just dressed in a fairy costume. I cannot tell for sure, but I am radio amateur, so at my age it does not matter anymore.

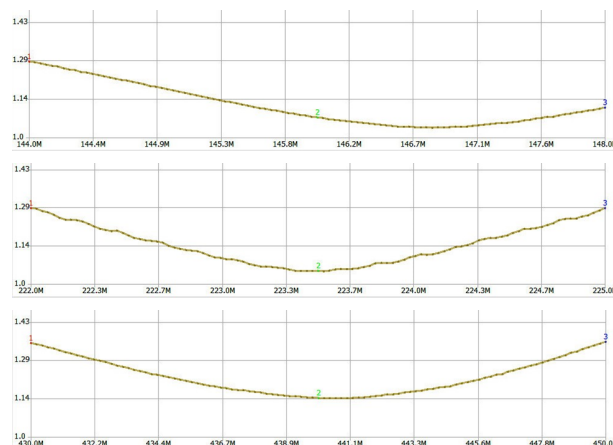
I felt somebody friendly patting me on my back. I turned around.

It's never too late for Halloween, it's never too early for Halloween.

What?

There is Halloween in each of us. You're cool, we're cool.

~ Daniel VE7LCG





Ham Hardware

John White VA7JW

Notes pertaining to on-air, IC-7700 microphone trials

A subjective evaluation of various microphones on-air using an Icom IC-7700 was performed with VA7JW transmitting to VA7OJ on 15m. VA7OJ provided opinion of the transmitted voice quality.

It had been noted, and reported variously on the web, that the Heil HC4/HC5 dynamic cartridges have low output, and so Mic gain had to be set rather high to achieve ALC deflection, and achieving compression was difficult. Bass and Treble controls were set at 0dB, factory default.

Possible defects or problems with the VA7JW Heil Pro Set + headset and adaptor cord was eliminated as a possible problem. VA7JW's headset & adaptor were tested VA7OJ's station, noting performance against his Pro Set +, adaptor and IC-7700. Performance was identical.

with 20 dB gain. Both used the +8V supply available at the Mic jack. While they performed well in terms of gain, fidelity and bandwidth, the idle noise produced in both circuits was only about 15 dB below signal.

A source of unusual low frequency rumbling (not hiss) was unable to be determined, and was identical under both circuits!

The preamp concept was abandoned without resolution.

Mic's tested were:

- Heil IC (electret)
- Heil Pro Set + HC4 and HC5 (dynamic)
- Icom SM-20 Desk Mic (electret)
- Icom HM-36 Hand Mic (electret)

The IC-7700 was connected to a Rigblaster Duo controller. IC-7700 controls were set at COMP ON WIDE, MIC and COMP varied to achieve ~ 50% ALC and 6-12 dB compression. RF Power set at 100%. Transmit bandwidth was set a 2.4 kHz.

Test 1 Heil IC

Adjusted Bass = 0 dB;

Treble = +3 dB;

Mic Gain about 11 to 12 o'clock.



Audio preamps were built at VA7JW to raise Mic input levels to improve Mic, ALC, COMP gain setting ranges. Two versions were attempted; a discrete 2N3904 amplifier with a 2N3904 emitter follower, and dual op amp MC33172 equivalent, both

This setting was determined for 2 reasons. A) judged as best intelligibility over air and B) best setting for power distribution. Voice audio has most power concentrated in the lower frequency range while intelligibility is attributed to the higher frequency range. The 3dB Treble boost accentuates intelligibility under difficult conditions, and by not boosting Bass, RF power is made available for the high frequency audio to give punch.

ALC easily met 50%

COMP easily in range of 5- 10 dB

It was determined that the effect of inserting the Rigblaster DUO, as opposed to connecting the mic's directly to the 7700, was minimal, with possibly slightly better sound with DUO inserted! Connection through the DUO is metallic but with bias & switching circuits "attached". The DUO was left In-Circuit for all tests except for the (abandoned) pre-amp tests where the connection was direct to the 7700.

Subjective quality was good. Used this as the "standard" against which other Mic's were judged.

Test 2 Heil ProSet +

Same Bass / Treble setting

MIC Gain had to be set to 3-4 o'clock to compensate for the low output levels;

ALC was 50%, but was limited;

COMP just made the 6 -10 dB;

HC-5 cartridge sounded much like the Heil IC;

The HC-4 cartridge sounded good as well but more penetrating. We concluded HC-4 had the edge for contest & DX'ing.

Test 3 SM-20

This is a high output mic and so settings were much the same as the Heil IC. The Heil IC sounded better, which was a surprise! - this is supposed to be a very good full range mic).

Test 4 HM-36

Also a high output mic and so settings were much the same as the Heil IC. The Heil IC sounded better. This mic is suitable for portable use.

Other Observations

The spectrum of VA7JW transmitted signal looked good, i.e. no excessive bandwidth occupancy, in all instances as observed by VA7OJ.

A Coaxial Dynamics (Bird equivalent) in-line Watt meter measured RF Power Out. This meter is capable of measuring both Average Power and Peak Power. Full peak power was achieved under these tests. It was interesting to observe average power output as COMP is increased.

Typically,

- Peak Power 200 W
- Avg Power, No compression 10-15W
- Avg Power, 6-10 dB compression ~ 50 W

ALC and COMP levels used preserved audio quality.

The Heil IC has a higher output than the Heil Pro Set + and provides lots of adjustment headroom. The Heil IC is a lighter, more comfortable headset compared to the Heil ProSet +

~ John VA7JW





Thoughts from the Shack

Tonny van den Burgh PA4TON

The resistance properties of a wire

In his life as a teacher in the amateur radio world, Tonny has collected a lot of teaching material, compiled courses and has decided to open up part of his archive for us. In this issue something about the skin effect. Because as radio amateurs we are familiar with the concepts of direct and alternating current resistance. But what does that actually mean for us in practice?

The resistance of a wire

The DC resistance of a conductor, also known as pure ohmic resistance, is determined by:

- the length (of a wire in meters)
- the diameter (A) (or surface), do not confuse with the diameter (D) is $22/7 \times D^2$
- the specific resistance (at a certain surface, length and temperature)
- the temperature of the conductor (the warmer the higher the resistance)

In practice, it appears that the resistance also increases with the frequency, so that for a conductor a distinction must be made between direct current resistance and the alternating

current resistance. The latter therefore increases with the frequency, which is caused by the so-called skin or skin effect.

The skin effect therefore arises when there is an alternating current through a conductor. The current density on the outside of the conductor increases as the frequency increases. In other words: as the frequency increases, the electrons in the conductor will be pushed more to the outside of the conductor.

At very high frequencies, the electrons will therefore move almost at the surface of the conductor. In the figure on the right, I represents the alternating current through a conductor. As a result of I, an alternating magnetic field is created, the lines of force of which run in circles perpendicular to the longitudinal axis of the conductor (\emptyset).

This alternating magnetic field will create circular currents in the conductor in planes perpendicular to the lines of force. These circular currents work against the original current inside the conductor and amplify the original current on the outside side of the conductor.

These circular currents cannot cancel each other out because the magnetic field strength from the center of the conductor to the wall is constantly increasing.

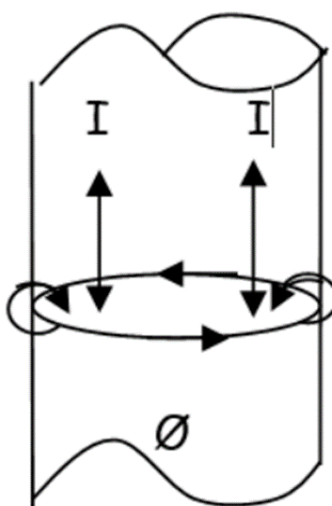


Figure 1 Alternating current (I) in a wire

The result is a power distribution, which is constantly increasing from the inside to the outside. Since the induction is proportional to the frequency, the phenomenon will become stronger at higher frequency. The result is that fewer and fewer electrons will run inside the conductor and more and more run on the outside.

The electrons therefore must settle for an ever-smaller active wire cross-section with increasing frequency, so that the resistance of the conductor increases. However, the skin effect will only exert a major influence for frequencies above 10 kHz. Hence the name skin or skin effect. The explanation of the skin effect rests on Faraday's Law: An alternating current through a conductor tends to run mainly on the surface.

In addition, the skin effect has a greater influence on thicker diameters. We see this in the table below, in which the quotient (the result of a division) of the alternating current resistance (R_w) divided by the direct current resistance (R_o) at certain frequencies for conductors 0.5 and 0.8 mm is given.

$f = \text{KHz}$	0,5 mm	0,8 mm
10	1	1
100	1,04	1,23
200	1,14	1,62
500	1,61	2,43
1000	2,18	3,33

R_o applies to a 1 km conductor 0.5 and 0.8 mm respectively.

In order to keep the losses on conductors at high frequencies within reasonable limits, one must therefore work with thicker wires, despite the fact that the current conduction almost only but takes place on the surface of the conductor. The thickness of the layer that is mainly used for flow passage is called the penetration depth. This amounts to e.g. for 10 MHz: 20×10^{-3} mm (two hundredths of a mm).

This is also the reason that, at higher frequencies, the conductors are silvered, because thanks to the higher conductivity of silver we get a lower alternating current resistance.

Although the skin effect is considered a disadvantage due to the resistance increase, this effect also offers an advantage with coaxial conductors or concentric lines. After all, as the frequencies increase, the currents in a coaxial conductor concentrate, respectively, along the outer surface of the inner conductor and the inner surface of the outer guide, so that there is practically no external field anymore. As a result, the coaxial conductor can no longer exert a disturbing influence to the outside. Conversely, interfering external electromagnetic fields lack their influence on wave propagation within the coaxial conductor, so that a high degree of interference freedom is achieved.

Multi-stranded Wire

Also known as Litze wire. To reduce the effects of the skin effect in a conductor, the conductor can be made up of many mutually isolated wires, which are connected in a certain way. After all, in a conductor of constant composition, all electrons are displaced to the outside, as a result of which the current density to the outside of the conductor increases more and more. By assembling the conductor from mutually isolated wires, the skin effect will occur in each wire separately. For the entire pipe, however, all wires of the pipe carry the same current, so that in this way a better and more even current distribution for the entire conductor will occur. This means a lesser resistance increase and therefore less losses at higher frequencies by using stranded wire.



Tonny PA4TON was licensed in the Netherlands in 1998 (N-class)

Upgrade to C-class in 1999 and in 2003 CW to A-class.

Tonny volunteers at the young researchers Groningen Department of electronics.
<http://www.djog.nl/>

After 20 years as a course leader, he has published a book with more than 1300 detailed exam questions for the full registration and as a reference work for the amateur.

You achieve that effect with stranded wire; a wire with composite core, as a counterpart to wire with solid core.

Up to frequencies of +/- 1 MHz, this multi-stranded wire is very useful. At higher frequencies, the capacity between the wires will play a disturbing role and irregularities in the structure of the wire will also be reflected strongly.

Multi-stranded wire is mainly used in the manufacture of coils, which can therefore obtain a higher quality factor Q. However, there is one but: the Q of the coil is also affected by the skin effect. The Q-factor is determined by $\omega L/R_s$ and it is precisely the coil resistance (R_s) that is increased by the skin effect, with the result that Q becomes smaller. If R_s did not increase, Q would increase with an increase in frequency (ωL means $2\pi f L$).

~ Tonny PA4TON

With thanks to Tonny and the [Dutch Amateur Radio Union](#) (DARU) for permission to reprint this article.

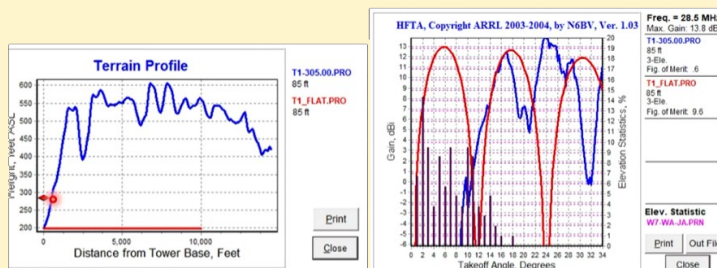
HF Terrain Analysis Presentation

HF Terrain Analysis of VE7SCC antenna systems and For Your Station: If you missed the presentation, it has been recorded and you can see it at:

https://youtu.be/Ys_MSyeheS0?t=275

The presentation focused on how your station's performance is dramatically affected by terrain up to 3km around you. Do you wonder if it would be worth investing in a taller tower? Do you think stations by the ocean get better results? Do you think a contest station works better on a mountaintop or on the prairies?

In this presentation, Adrian VE7NZ, will show you how to use ARRL's HFTA software to answer these questions and more. You will also be shown how to use HFTA software to profile your station.





Ham Radio outside the box

VA3KOT

John Corby

Why a Battery Weighs More When It's Charged

We welcome John as a contributor to The Communicator.

It's the middle of December as I write this. My backpack radio kit hasn't had a good workout since I last took it out in the field for a Parks On The Air (POTA) session a couple of months ago. But, we got lucky with the weather one day this past week. The temperature got up to 14 degrees Celsius before strong winds brought in a Colorado low and took the mercury back down to the freezing zone.

I got a chance to set up as a "Backyard On The Air" station to test a new portable antenna I had built for next summer's outdoor operating season. My Bioenno LiFePO4 battery was freshly charged for the occasion and I was eager to get out on the deck and fire up the rig to see how well the new antenna would perform.

The Common Cold virus had invaded my bloodstream and I was feeling a little weak as I picked up the backpack containing my Yaesu FT-891 radio, a homebrew L-match tuner, the Bioenno battery and various cables and accessories that I like to carry with me on a field trip. "Strange" I thought, "this backpack feels a little heavier than usual".

Maybe it was just the debilitating effects of my mild illness that was affecting me, but I wasn't sure. Then suddenly I had one of those "light bulb moments". "Of course" I thought, as my university Physics training began kicking my brain into high gear, "I just charged the battery, so that is obviously the reason the backpack feels heavier than usual".

Now most people have probably heard of Albert Einstein's famous energy/mass equivalence equation, $E=mc^2$. It may not have much relevance to most people's everyday lives. Not so for me. From my teenage years I was on a path toward a lifetime of science awareness. I vividly recall my high school physics teacher's erudite response to a student who complained that his pen had disappeared. "Don't be silly boy; if your pen had disappeared the whole city would be lying in ruins".

Do the math yourself. Take the mass of an average pen and multiply it by the square of the speed of light. That's one heck of a lot of Joules to unleash on an unsuspecting city. Old Albert had hit the nail squarely on the head with his $E=mc^2$ equation.



John VA3KOT resides in Owen Sound, Ontario but is more often found operating CW out in the "Big Blue Sky Shack". He especially enjoys activating parks for the POTA program and blogging about his experiences at HamRadioOutsidetheBox.wordpress.com

Einstein's genius was further driven home to me when I started my freshman year in college. A bunch of long-haired 1970s yahoos had to be indoctrinated into the wonderful world of Physics. And the faculty staff had a cunning trick to do just that. Teach those long-haired kids how to make an atomic bomb! In fact, teach them all of the different ways to build an atomic bomb. Just keep those long-haired weirdos away from any source of Uranium or Plutonium.

We did have a radio-isotopes laboratory in which we could indulge our fantasies of playing god with the World. Special clothing had to be worn when we entered the lab. When we left the lab we had to undergo a full-body scan with a Geiger counter to ensure we were not sneaking any dangerous isotopes out with which to create criminal mischief. The local police were familiar with our penchant for mischief so every caution was very well advised.

And so it dawned on me; at last I understood why my backpack radio kit seemed heavier than usual - I had just charged the battery! I know; you are getting a bit skeptical around about now. "This idiot must be enjoying a little bit too much of the old 'Scottish Champagne'" you may be thinking. You may be right, but trust an old Physics grad; the mathematical proof is in old Albert Einstein's equation.

My Bioenno battery is rated at 12Ah and although it puts out over 13 volts most of the time, let's call it a 12V battery. Whatever number we calculate for the increased weight can then quite honestly be claimed to be a conservative number.

So here we go;

A 12V battery with a storage capacity of 12Ah holds 144Wh of energy.

1 Watt = 1 Joule per second

So $144\text{Wh} = 144 \times 3600\text{J} = 5.18400 \times 10^5 \text{ Joules}$

Using Einstein's mass/energy equivalence equation, $E=mc^2$

$E/c^2 = 5.184 \times 10^5 / (3 \times 10^8)^2$

$= 5.184 \times 10^5 / 9 \times 10^{16}$

$= 5.76 \times 10^{-12} \text{ Kg}$

$= 5.76 \times 10^{-9} \text{ g}$

$= 5.76 \text{ nanograms}$

Alright, a handful of nanograms isn't a whole lot, but when you're out hiking to a radio spot at the top of a steep hill on a hot humid day, where do you draw the line? Quod Erat Demonstrandum!

~ John VA3KOT

Club News, Amateur Radio Courses, Nets and Articles...



Amateur Radio Courses: <https://www.rac.ca/amateur-radio-courses/>

Radio Amateurs of Canada is pleased to continue to promote Amateur Radio Courses - including Basic, Advanced and CW which are being organized by clubs so please send them to us. For example, the Surrey Amateur Radio Communications (SARC) in partnership with the Surrey Emergency Program Amateur Radio (SEPAR), has an online class starting on September 19th.



Cruising the Blue Ridge Parkway

In May, we met up with our friends Paul/KF9EY and Beth/KB9DOU for a trip on the [Blue Ridge Parkway](#). Joyce/K0JJW and I had been on the parkway before but had not completed the whole route. We all thought it would be a great trip to do together, in about a week, so we would not be in a rush. Both couples have Class B RVs (camper vans), which are well-suited for such a trip.

The Blue Ridge Parkway is part of the National Park Service, construction started in the 1930s and took decades to complete. The basic concept is a scenic road with a maximum speed limit of 45 MPH connecting [Great Smoky Mountain National Park](#) and [Shenandoah National Park](#). We met at the Smoky Mountain end of the parkway and traveled north to Shenandoah.

Of course, we included some Summits On The Air (SOTA) and Parks On The Air (POTA) activations. The Blue Ridge area is target-rich with SOTA and POTA opportunities.

Typical photo of the Blue Ridge Parkway

Clingmans Dome

Our first Summits On The Air (SOTA) activation was from Clingmans Dome (W4C/WM-001), the highest spot in the Great Smoky Mountain NP. This is an easy activation with a half-mile hike (one way) to an observation tower. See my previous trip report [here](#).

We opted for a simple VHF SOTA activation, using a Yaesu FT-2DR handheld transceiver and an RH-770 whip antenna. The observation tower was not too crowded and we were able to make a surprising number of 2m FM radio contacts. We just called CQ on 146.52 and raised a number of

*Bob maintains a great
blog site at
<https://www.k0nr.com/worldpress/>.*

*Contact Bob at
bob@k0nr.com.*

*You can also check out
his book
[VHF, Summits and More:
Having Fun With Ham
Radio](#).*





home stations, mobile stations, and a few campers. Joyce, Paul, and I all completed at least 10 contacts so we decided to submit the activation for both POTA and SOTA.

Blue Ridge Parkway

Then we headed up the parkway, stopping along the way for photo opportunities, a winery visit, lunch stops, and short hikes. We stayed at different campgrounds for three nights along the parkway. To activate the parkway for POTA (K-3378), we stopped at a picnic area for lunch and set up for 20m SSB. We used our typical POTA setup: Yaesu FT-991 driving an end-fed-halfwave antenna supported by a fishing pole.

The station worked well for us but it was a little slow completing contacts on 20m. A 20 AH Bioenno battery supplied the DC power for the FT-991 and we kept the RF output at around 50 watts. I used HAMRS on my Windows PC for logging and it worked well for me. (That logging program keeps getting better with each revision.) Paul and Joyce preferred to log using old-fashioned pen and paper.

Loft Mountain Campground

We camped the last two nights of our trip together at Loft Mountain Campground in Shenandoah NP. This is a rather unique spot in that the campground is located on top of a broad SOTA summit and is inside a national park. The SOTA summit is appropriately named Big Flat Mountain (W4V/BR-009), while Shenandoah NP is park K-0064. This makes for an easy SOTA plus POTA activation.

The summit is located inside the National Radio Quiet Zone, which may require you to coordinate with the NRQZ before operating. However, the W4V Association Reference Manual says that “the typical SOTA activation does not require coordination,” mainly because it is a short-term, temporary radio activity.



Right: Joyce/K0JJW makes 2m FM contacts from Clingmans Dome while Bob/K0NR stands by.

Below: Bob/K0NR making 20m SSB QSOs on the Blue Ridge Parkway. Note the two Class B RVs in the background.



Once again, we operated midday on 20m SSB and had reasonably good propagation. Joyce and I made some stateside contacts but when Paul took over, he snagged a couple of European stations. That might be due to his superior operating skill or maybe the band just shifted. Between the three of us, we made 45 QSOs in about an hour or so.

Summary

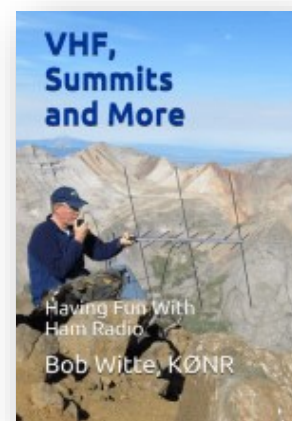
We had a fun time on this trip, which is another example of blending SOTA and POTA activities with a camping vacation. Our “leisurely pace” strategy worked out well and we were never in a hurry. Of course, there are always more things we could have done. The Blue Ridge Parkway has plenty of interesting tourist, hiking, and SOTA/POTA opportunities. Too many to do in a week.

~ Bob KØNR

This book is an easy-to-understand introduction to VHF/UHF ham radio, including practical tips for getting on the air and having fun messing around with radios. Learn about FM, SSB, repeaters, equipment, band plans, phonetics, portable operating, Summits On The Air (SOTA) activations and more.



Paul/KF9EY worked 20m POTA while Joyce/K0JJW does the logging.





Activate A Hoosier SOTA Summit (W9/IN-002)

We have been looking for an opportunity to activate a SOTA summit in our home state of Indiana. Joyce/K0JJW and I were both born there and misspent our youth there. Of course, you might be thinking “there are SOTA summits in Indiana?” Yes, there are three. Two of them are on public land, one is on private land and apparently inaccessible. These three summits are in the southern part of the state, not too far from the hills of Kentucky.

We were headed south towards the Smoky Mountains and passing through southern Indiana and decided to activate Jackson County HP ([W9/IN-002](#)). First, we camped at one of Indiana’s best state parks: [Brown County State Park](#), about an hour away from IN-002. The next day we headed to the [Jackson-Washington State Forest](#), where the

summit is located. The Indiana Dept of Natural Resources supplies this trail map. As you’ll see, there are a number of trails that can take you to IN-002, but we chose the most direct route, starting at Knob Lake.

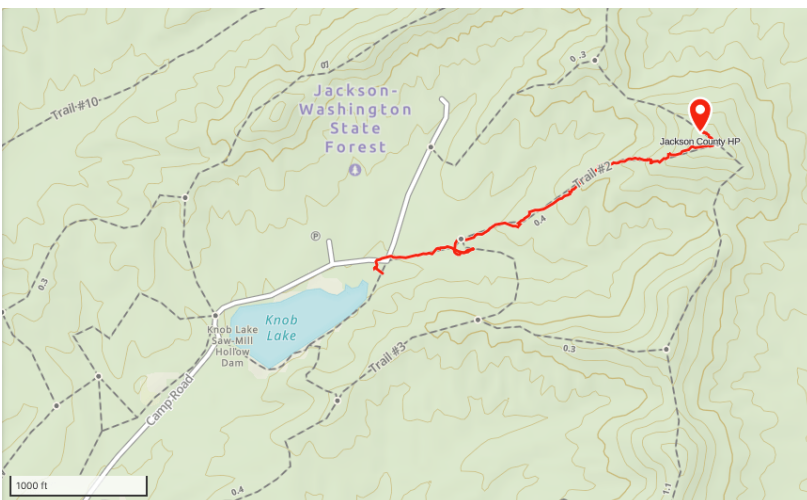
There is a State Forest campground around Knob Lake, so that would be another option for camping out.

The red line shows our track up to the summit, starting from Knob Lake.

We headed up a gated road that was labeled “Trails 2 and 3”. This road narrowed into a trail and we took a left turn at the Trail 2 sign. This is slightly tricky because Trail 2 goes off to the left and it continues on straight. The “left” Trail 2 ascends up to IN-002, for a total elevation gain of 465 feet and a distance of 0.7 miles. Go Left.

Once on top, we unpacked our recently purchased Icom IC-705 transceiver. This seemed like a good choice for this activation. While we were sure to try good old 2m FM, there was a good chance that we would get skunked on VHF at this rural and not-too-high summit. Sure enough, 2m FM was silent, even using the mighty 3-element Yagi antenna.

Next, we set up the end-fed halfwave for 20 meters, hoisted by the popular extendable fishing pole. OK, I admit that I had to do some fiddling around with the antenna to get the SWR to behave. Somehow, the test



run at the campsite the day before was not sufficient. The SWR was way too high for the “I like 50 ohms” Icom, so some adjustments were required. After an unreasonable amount of fiddling, we put out an SSB signal on 20 meters that seemed good.

The band conditions were not great but they were not terrible. Calling CQ did not seem to work very well, so we tuned around and worked a number of Parks On The Air (POTA) stations to get our 4 QSOs. At that point, we declared victory and headed back down the hill.

This summit was easy to access and an easy hike. If you are in the area and want to knock out a Hoosier SOTA activation, this one is a great choice.

~ Bob KØNR



Show us yours...

‘Build a Key’ contest

OK, so Luc showed us how you can make a key in the March-April 2022 issue of The Communicator. Be it ‘straight’ or a ‘sideswiper’, its your turn... Metal? Wood? 3D-printed? SARC is sponsoring a contest for home-built keys. We will award a prize to the following categories:

The most useful key

This key must be compact, accurate, comfortable to use and reasonably sturdy.

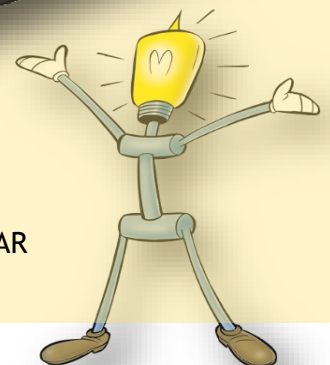
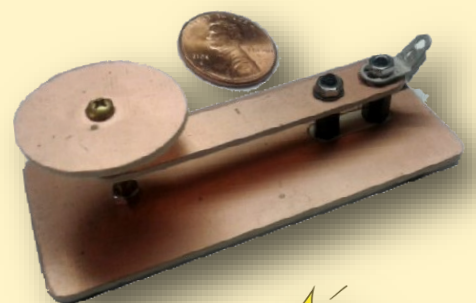
The most beautiful key

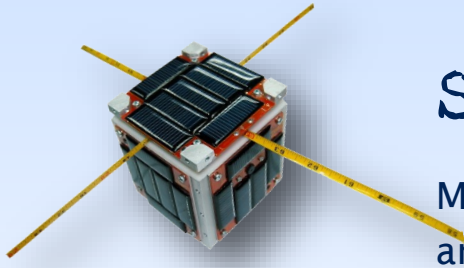
Goes without saying... this one must be a thing of beauty but must also conform to the above criteria of being accurate, comfortable to use and reasonably sturdy.

The most unique key

Aside from being accurate, comfortable to use and reasonably sturdy, let your imagination run wild.

Because we have to judge these locally, the contest is only open to SARC and SEPAR members. Results will be published in the Fall issue of The Communicator.



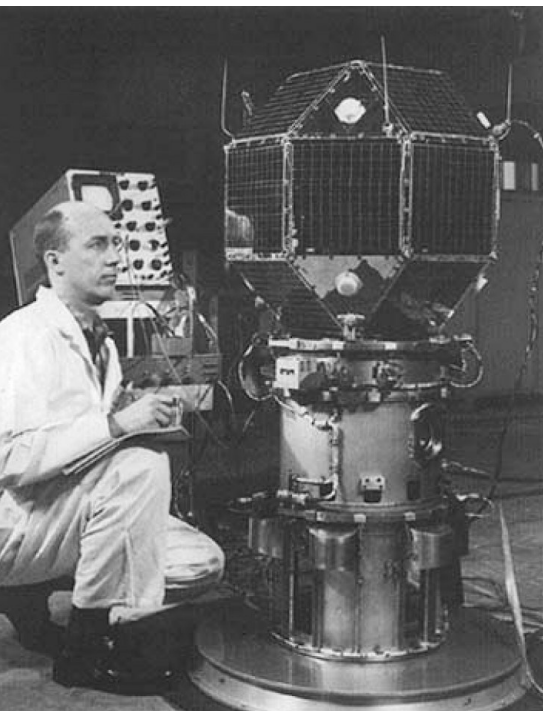


Satellite News

Meet some of the oldest "undead" spacecraft that are still going strong

Lincoln Experimental Satellite 1 and others

Believe it or not, according to the Index of Objects Launched into Outer Space maintained by the United Nations Office for Outer Space Affairs, there were 7,389 individual satellites orbiting our little planet at the end of April 2021 (others place the number closer to 6,500). This number is only set to increase over time, with some estimates coming in at around 990 satellites being added to the mix every single year.



If true, by about 2028, we can expect to see somewhere in the order of 15,000 satellites orbiting Earth. This includes the massive increase in satellites scheduled to be deployed by companies like SpaceX in their Starlink constellation. The rise of small CubeSats, microsats, nanosats, etc, may also increase the number several-fold over the coming decades or so.

LES-1

LES-1 is what is technically known as a "zombie satellite"

Of the satellites in space, most are used for either commercial telecommunications or navigational purposes, with others used for scientific or military purposes. The vast majority, around 60%, is actually defunct and have been left to their fate.

Another of the oldest, sort-of functional, artificial objects in [space is LES-1](#). Also known as the Lincoln Experimental Satellite 1, it was originally designed as a communications satellite.

LES-1 was launched into Earth's orbit in February of 1965 from Cape Canaveral, Florida with the specific task of studying the use of ultrahigh-frequencies (UHF) radio transmissions. LES-1 was never able to reach its optimal orbit, due to a wiring error causing the rocket motor to fail to fire as intended, and the satellite shut down its transmitters in 1967.

LES-1 was the first of a series of satellites that formed MIT Lincoln Laboratory's first foray into the building and testing of communications satellites. The main goal of the project was to increase the transmission capabilities of communications satellites that were limited due to their inherently small size.

LES-1 has a roughly polyhedral body shape, is round 5-feet (1.5m) tall, and was powered by a series of solar cells clad to its main body. The satellite was designed to last for about 2 years, during which it would take part in telecom experiments from base stations in Westford, Massachusetts, and Pleasanton, California.

Believed to be a lost cause, LES-1 was largely forgotten about by the world until it spontaneously began to resume radio transmissions in 2012. The signals from LES-1 were first detected by [Phil Williams](#) from Cornwall, England, UK, and were later verified by other zombie satellite hunters. Apparently, a short had developed in the satellite's systems allowing power from the solar cells to reach the transmitter directly.

LES-5 is still very much open for business

Hot on the heels of LES-1 is its younger sibling LES-5. Also built by MIT's Lincoln Labs, it was launched into orbit in 1967.

Like other LES satellites, LES-5 was built to test the viability of a satellite-based military communications program and was placed in a geosynchronous orbit. The satellite was used until 1971, after which its mission was deemed complete and it was deactivated.

[LES-5](#) was then sent into what is termed a "graveyard orbital slot" used by many other redundant spacecraft. Since then, LES-5 has effectively been largely forgotten about and ignored.

LES-5 was one of nine other experimental satellites for use as testbeds for a variety of devices and telecom techniques for the United States Air Force. LES-1 was launched in 1965, with the last LES-9, launched in 1976. Most of these are still in orbit, with LES-3 and LES-4 officially destroyed when they entered Earth's atmosphere.

However, in 2020, a self-described dead satellite finder, Scott Tilley, found that the telemetry beacon for LES-5 was still transmitting at 236.75 MHz. Whether or not you consider this as a "working" satellite, or not, it is fascinating to find such early space tech still working.

AMSAT-OSCAR 7 continues to function just fine

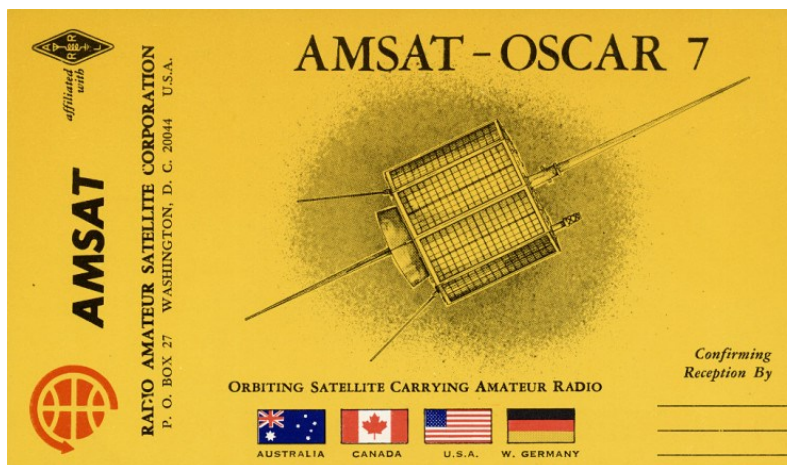
Source: [AMSAT g7ahn/Wikimedia Commons](#)

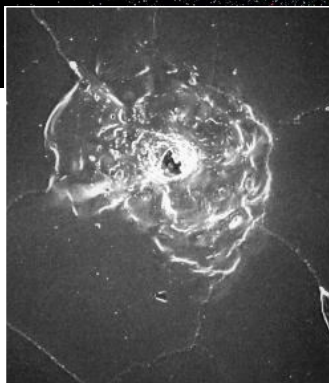
Yet another "zombie satellite" in orbit around planet Earth is [AMSAT-OSCAR 7](#) (AO-7). It was the second so-called "Phase 2" satellite designed and built by the Radio Amateur Satellite Corporation, or AMSAT for short.

Launched into orbit in November of 1974, the satellite worked as expected for many years until its batteries finally died in mid-1981.

AO-7 carries two amateur radio transponders. The first, its "Mode A" transponder, has an uplink on the 2-meter band and a downlink on the 10-meter band. The second called its "Mode B" transponder, has an uplink on the 70-centimeter band and a downlink on the 2-meter band.

AO-7 also carries four beacons which are designed to operate on the 10-meter, 2-meter, 70-centimeter, and 13-centimeter





Top: [A real-time debris visualization.](#)

Officials from the space shuttle program have said the shuttle regularly takes hits from space debris, and over 80 windows had to be replaced over the years. The ISS occasionally has to take evasive maneuvers to avoid collisions with space junk. And of course, this debris is not just sitting stationary: in orbit, relative velocities can be quite large, ranging in the tens of thousands of kilometers per hour.

[bands](#). The 13-cm beacon was never activated due to a change in international treaties.

The satellite has also played its part in global affairs too. In the summer of 1982, the anti-communist Polish Solidarity movement learned that AO-7 was periodically functional when its solar panels got enough sunlight to power up the satellite. Activists used the satellite to communicate with Solidarity activists in other Polish cities and to send messages to the West. Since the regular telephone network was tapped by the government and ham radios were easy to track, the satellite link was an invaluable asset.

Miraculously, after several decades of silence, the satellite began to resume transmissions in June of 2002. The reason appears to be the fact that one of its batteries shorted, allowing it to become an open circuit and allow the spacecraft to run off its solar panels when the satellite is in direct sunlight.

Today, AO-7 is officially one of the oldest remaining communications satellites in existence.

Tracking Debris

NASA and the US Department of Defense cooperate and share responsibilities for characterizing the satellite (including orbital debris) environment. DoD's Space Surveillance Network tracks discrete objects as small as 2 inches (5 centimeters) in diameter in low-Earth orbit and about 1 yard (1 meter) in geosynchronous orbit. Currently, about 27,000 officially cataloged objects are still in orbit and most of them are 10 cm and larger. Using special ground-based sensors and inspections of returned satellite surfaces, NASA statistically determines the extent of the population for objects less than 4 inches (10 centimeters) in diameter.

Collision risks are divided into three categories depending upon size of threat. For objects 4 inches (10 centimeters) and larger, conjunction assessments and collision avoidance maneuvers are effective in countering objects which can be tracked by the Space Surveillance Network. Objects smaller than this usually are too small to track for conjunction assessments and collision avoidance. Debris shields can be effective in withstanding impacts of particles smaller than half an inch (1 centimeter) for the U.S. modules on the International Space Station.

[Low Earth Orbit Visualization | LeoLabs](#)

~ NASA & Christopher McFadden
[Meet some of the oldest "undead" spacecraft that are still going strong \(interestingengineering.com\)](#)



Mike Weir VE9KK

My ham radio adventure continues...

Way back in high school one of my classes was band class, now this was not brass band but strings and wood wind. I was a cello player and very much enjoyed it but when it was time to sign it out to practice at home I had wished I picked the flute... I digress... What does the cello have to do with ham radio? Well back when I was in band class part of our testing was to listen to a recording of an orchestra playing and identify as many individual instruments as we could. Simple with violin, double bass, cello and clarinet. But the Oboe, Bass and E-flat Clarinet, Bassoon, Contrabassoon and then the Viola. Our teacher told us to close our eyes as we listened and it would make things much easier and over time it did.

So you ask again what does this have to do with radio? For the past 6 months I have been on a mission to build up my copy speed of Morse code. I really did not like the code and had to learn it and I say "had too" because when I first went for my ham ticket the code was a requirement. I learned the code back then to later forget it once I obtained my ticket.

I have come full circle to respecting and admiring the skill of Morse code. I worked very hard to learn the code and it's very true if you don't use it you lose it. I had lost it over time but in my mid 50's I started again to learn it and wanted to master it....have not got there yet but the challenge keeps me sharp.

I am focusing on contest Morse code and my next challenge will be a higher speed QSO Morse code. I am at the point now (35-38 wpm contest code) that as my practice contest code programs spill the code at me I find myself typing the letter or number and looking at the screen on the PC to see if it's correct and then listen for the next letter. At 36-38 wpm looking at the letter to confirm is not an option I end up missing letters and not getting the call sign or exchange correct.

Now at this speed of code I strongly recommend proper home row touch keyboarding and not hunt and peck the letters and numbers. As mentioned in a past post thank goodness in school I took typing and am able to touch type. As I struggled to hit the 35-38 wpm mark I remembered my music teacher... "close your eyes and listen." I did just that and my rate of copy went from 70% up to the 90's. I don't keep my eyes closed all the time and I feel it's just really helping me to concentrate on the rhythm of the letters and numbers.

To close your eyes and listen sure does the trick for me.

~ Mike VE9KK

Mike writes from New Brunswick, Canada. Contact him at ve9kk@hotmail.com and visit his site at ve9kk.blogspot.com



on the Computer

Radio net logging software

For Radio Amateurs and Other Radio Operators

Many radio operators participate in [on-air meetings](#) called nets. From ham radio clubs or groups of friends who want to stay in touch, to emergency response and weather spotting teams practicing for emergency communications on simplex frequencies and repeaters, both planned and spontaneous, there are on-air meetings going on somewhere at almost any time.

WCS Radio Net Logger Windows software by Walker Consulting Solutions is a convenient way to keep track of your net operations. With this software, you can log the frequency details (frequency, tone, offset, notes) as well as net participant information (name, call sign, notes and more).

Net information is displayed on screen in the user-friendly interface and reports can be saved to text files for later reference. This

data can also be exported to extensible markup language (XML) files. These data files can later be imported back into the software to review the net and participant

information or to make changes. This also makes it easy to share the net info with others who weren't able to check in to the net.

Didn't quite catch a net participant's name? WCS Radio Net Logger has a convenient call sign lookup feature that will get participant info directly from the FCC license database using the FCC's application programming interface (API) functions. An active internet connection is required for this feature.

WCS Radio Net Logger is the perfect way for all radio operators to keep track of their on-air meetings. Whether you're a net control operator, amateur radio net participant, emergency coordinator or you are just taking notes, this software makes it easy to record information about your nets. And, best of all, it's *completely free* (although, if you really like it and want to help out, there is a PayPal donate button to contribute).

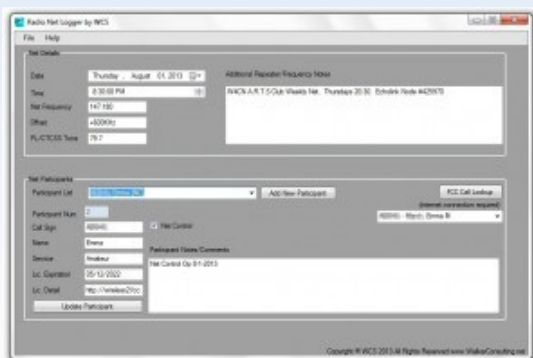
The authors created this software for the radio community at large. If you have questions, comments, ideas for more ham radio software or other feedback on this software, please use the 'Contact Us' function of their website.

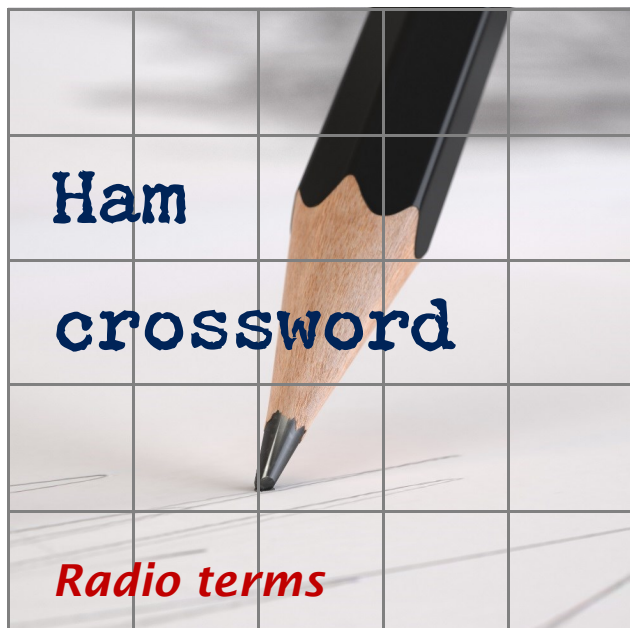
[Download WCS Radio Net Logger Now](#)

Click here to download the zip file containing the software and user guide

[Click here to view the user guide only \(PDF\)](#)

~





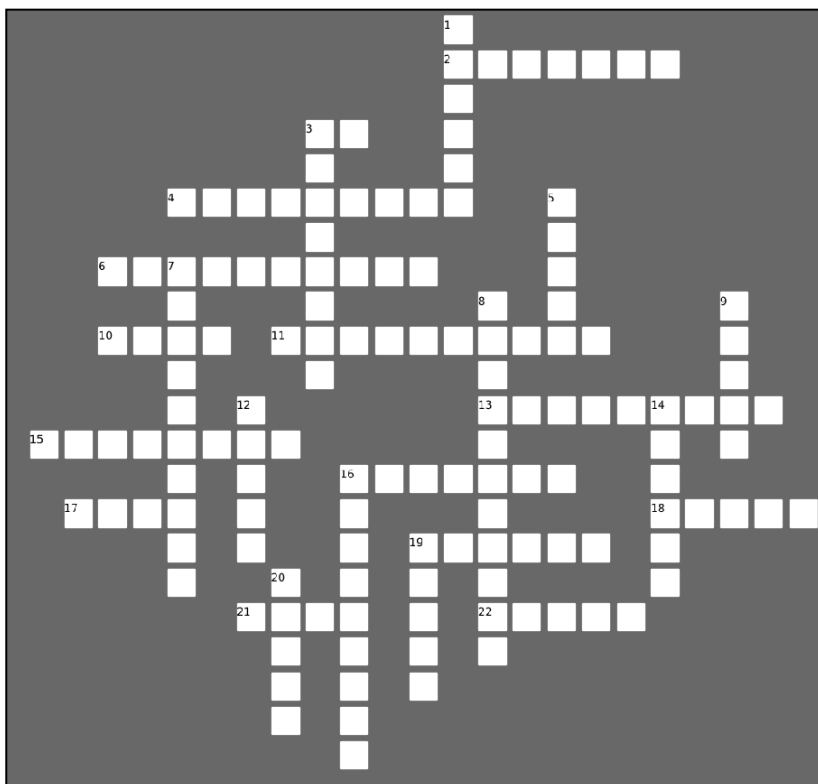
Across:

2. A device that picks up or sends out radio frequency energy
3. Morse code
4. _____ modulation
6. The process of varying an RF carrier in some way
10. The metric prefix for 10^9
11. A circuit that uses a quartz crystal for accuracy
13. A device that allows repeater users to make telephone calls
15. A device that allows a dual-band radio to use a single dual-band antenna
16. A type of feed line with one conductor inside the other
17. _____ frequency oscillator
18. A ham who acts as an advisor or mentor
19. An amateur station transmitting for the purposes of observation of propagation
21. A protective thin metal strip mounted in a holder
22. A slight shift in transmitter frequency when keying

Down:

1. From the French m'aidez (help me)
3. A tone or beep transmitted by a repeater
5. Phonetic for the letter 'R'
7. A packet-radio station used to retransmit signals
8. A measure of the ability of a capacitor to store energy
9. A diagram using boxes to represent sections of a complicated device or process
12. A variation of the cubical quad with triangular elements
14. The basic unit of electrical current.
16. The condition in which two packet-radio stations are linked
19. Contraction for balanced to unbalanced
20. A station accessory that allows you to test or adjust transmitting equipment

Solution page 115



TECH TOPICS

...more

David Cameron VE7LTD

Solving One Source of UHF Interference in the BC Lower Mainland

Recently, some users of the VE7RPT repeater system in the Lower Mainland of BC noted that there was some weak signal that would periodically cause the repeater to stay stuck on transmit for extended periods of time. This sounded like a weak, unmodulated signal which caused the system to repeat loud white noise which interfered with a number of nets and other valid use of the system.

The VE7RPT repeater system comprises several receivers, both 2m and 70cm, both at the site and remote. Also, the repeaters do not utilize CTCSS tones on the input, so any signal on the receiving frequency will be repeated. After some troubleshooting, it was determined that the noise was coming into the system from the UHF receiver on Mt. Seymour.

I have worked over the past few years discovering, identifying, quantifying, hunting, and resolving several issues in the ham bands, commercial bands, TV spectrum, and public safety. Recently, I discovered there was a lot of cross talk between transmitters and receivers on Mt. Seymour, and resolved the majority of it with specific filtering of signals both from the transmitters and to the receivers. The tool I used to track and find these is a software defined receiver (SDR)-

connected to the receivers being interfered with. I could then watch what the receivers were hearing when various transmitters were keyed at the site.

For example, due to a poor design, the 220 repeater made by BridgeCom in the US is inherently noisy on the VHF ham and commercial bands. When the transmitter was on the air, there was a lot of RF energy transmitted where it should not have been, and was interfering with both ham and commercial users in very close proximity to the site. The solution was adding a bandpass filter on the output to reflect any out-of-band signals back to the repeater, and prevent them from reaching the antenna.

The SDR I use is an AirSpy R2 (<https://airspy.com/airspy-r2/>). It is a compact unit that is very effective from 24-1700MHz. It has great sensitivity and decent selectivity, but suffers in the presence of very strong signals. This is why when I use an SDR at a radio site, I must ensure that it is protected from the transmitters around the site by using a very selective filter between the antenna and the SDR. This allows me to operate the SDR at its highest gain settings, and allows some of the very weak signals to be viewable.



Figure 2 –
Airspy R2 SDR

For the UHF interference, around the start of April, I attached an SDR to the receiver multicoupler used at the VE7RPT on

the UHF repeater. A receiver multicoupler allows a single antenna to be shared among several receivers. It consists of a bandpass window filter, a low-noise preamplifier, and a splitter. Normally this is used to allow VE7RPT-UHF and VE7RAG UHF to share the same antenna and duplexer. As this receiver was looking through half of the duplexer, and a window filter, I was only able to detect signals that were very weak between 448.000 and 451.00 Mhz. Outside of those frequencies, there was significant loss in the filters used.

While I was at the site, I plugged the SDR into a laptop, and used the SDRSharp software package to view 8MHz of spectrum in real time. Nothing really showed up on that day. I then connected the SDR to a computer at the site running Linux, and used software called SpyServer to remotely log into the SDR with the SDRSharp software, and watch the spectrum in near real time from anywhere with an internet connection.

Over the next few weeks, a few of us watched the SDR remotely. We quickly noticed that there was a signal that was always present, that was wandering around the band. We saw it as high and low as the extent of the filters in front of the SDR. The signal was fairly strong. It was once when we noticed it approaching the input frequency of VE7RPT-UHF, we noted the weak signal reported by others being repeated on the system. It sounded the same, and had a similar strength to the signal causing the issue. We noted the frequency it was on, and any other characteristics so when we saw it again, we could identify it.

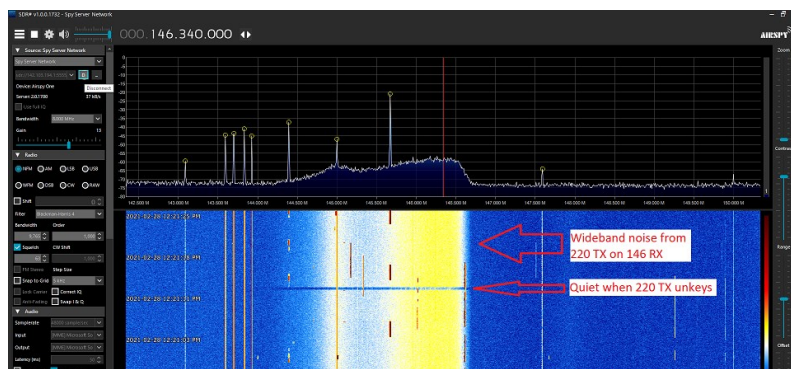


Figure 1 – RPT VHF Receiver with RPT 220 TX on air

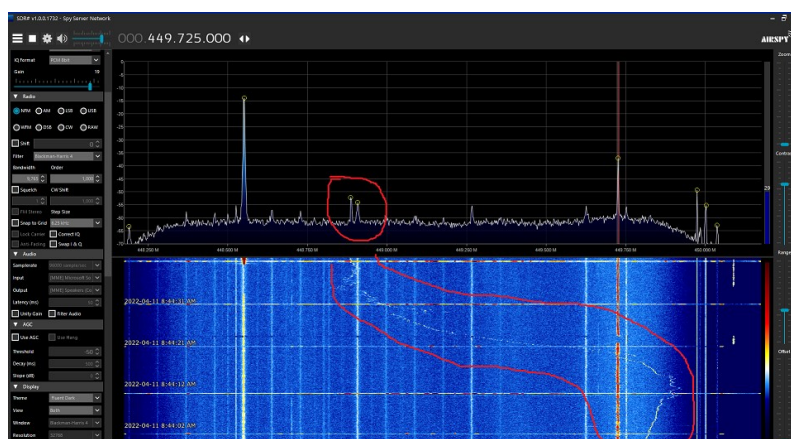


Figure 3 – Wandering Spurious Signal Received at Mt. Seymour

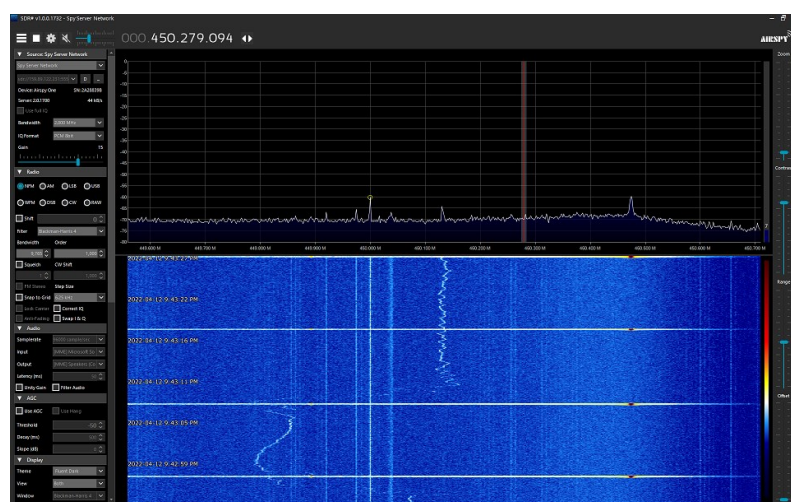


Figure 4 – Wandering Spurious Signal Received at Mt. Seymour



Figure 5 – Mobile Filters and SDR Setup



Figure 6 – Direction Determination from Mt. Seymour

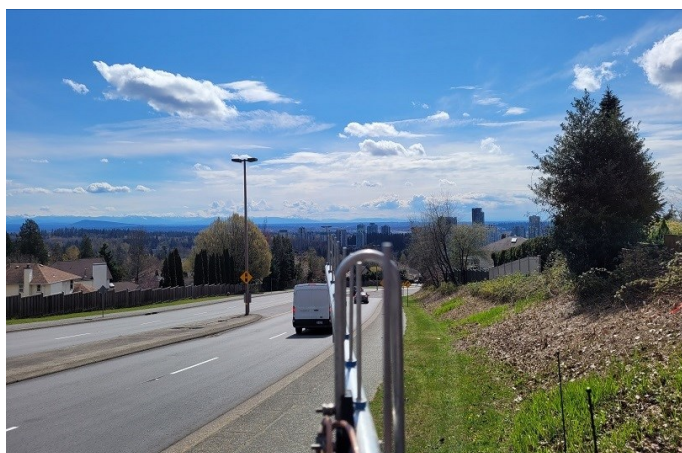


Figure 7 – Direction Determination from Westwood Plateau

After I realized it was continuous, and was wandering up and down the band, I set out to find the source and resolve the interference. So then the hunt began. I started first at the VE7RPT site on Mt. Seymour as I needed to determine if the signal present on the SDR was coming from something very close to the site, or perhaps something in the site itself.

In the vehicle, I had a pair of 7-inch Sinclair bandpass filters that were tuned to pass about 500kHz of spectrum, and provide significant loss/isolation outside of that. I required these because Mt. Seymour is home to several very high powered transmitters for TV, FM Radio, and commercial users. This kind of environment is almost impossible to operate an SDR in without some filtering. I connected the SDR through the filters to a dual band 2m/70cm mobile antenna on the outside of the vehicle. The filters also had marks on them where I could use a 3/4" wrench and adjust the passband on the road if the spur moved.

The first test was to see if I could hear the same signal on an SDR located in my truck that I was hearing on the SDR connected to the repeater antenna. As I was driving to the site for this test, I first saw the signal at the both of the last two east-to-west switchbacks on the road up the mountain. I stopped at both, and compared what was being seen at the site (via the SpyServer), and what I was receiving at the two locations on the way up the hill. I also noted that if I was not in one of the two switchbacks, the signal was way in the noise.

I started by using buildings on the Mountain as a reflector/shield, and was able to determine the signal was coming from the east. After doing a few laps of the parking lot, I connected a 10 element UHF yagi, and started trying to determine a specific direction. I quickly determined the direction to be somewhere around the Golden Ears Bridge in Maple Ridge and the CP Rail yard in Port Coquitlam.

This also lines up with the mobile findings on the switchbacks, as both of those switchbacks have clear views in that direction. With this information, I was satisfied that the source of the problem was not on the mountain, and I would have to drive east to try to find the source.

My next stop was Burnaby Mountain, as it has decent elevation above the terrain and good views to the east. Unfortunately, the signal was not present at that location. I was able to confirm it was still present at Mt. Seymour, but even with the directional antenna I could not hear anything.

I then drove to Westwood Plateau. As I approached the intersection of Johnson St and David Ave, I could hear the signal clearly on the mobile antenna. I drove around a bit more, but returned to that same intersection. I used the yagi to determine the signal was clearly coming from the southeast, towards the western end of Port Kells.

I then drove as far east as I could on David Ave into the Burke Mountain area. The signal was not present while driving, but as I went further east it became stronger. I stopped in a new building development on the eastern end, and found the direction to be towards Fleetwood area of Surrey, over the west end of Pitt River Bridge.

I was running out of time for the day, so I decided to drive south in the direction of the signals on my way back to North Vancouver. As I went over the Coast Meridian Overpass, I was surprised not to hear the signal at all. But as I continued south towards the Mary Hill Bypass, the signal level continually increased. I then noticed the strongest I had ever seen at the intersection of Pitt River Rd and Mary Hill Bypass. I knew I was close, but had no time to continue.

All the while I had been hunting, I had been relaying information to Ian Procyk VE7HHS over the phone. He was plotting the directions and figuring where the lines were intersecting. He provided some possible leads to the location of the source. Later that evening, Ian was able to pinpoint the signal to an area of the western-most extent of Pitt Meadows - just south of the Mary Hill Bypass and Pitt River Rd.

I met Ian the following day and confirmed the general location of the source. Using a portable spectrum analyzer, we were able to pinpoint it to one of two properties. We knocked on the door of one, and nobody was home. The second property had a person actively working outside. We approached them and asked if we could take some measurements from their yard, and they allowed it.



Figure 8 - Direction Determination from Burke Mountain

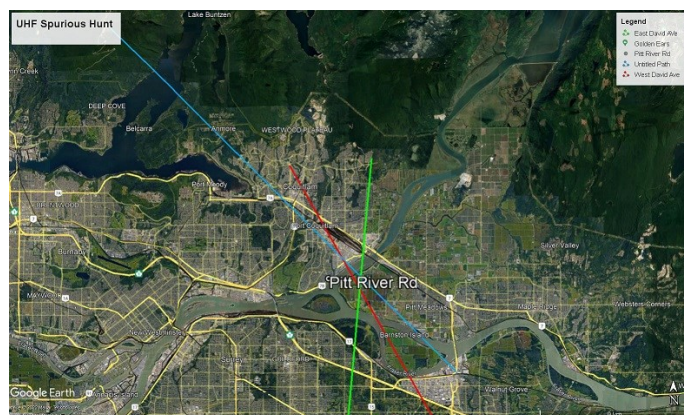


Figure 9 - Using Google Earth to Triangulate

We determined that the source was from the neighbouring property, and thanked them for their assistance. A hand written note and business card was left in the door of the suspect property, and we waited to hear back. We also noted a clear line-of-sight to Mt. Seymour and Westwood Plateau, but Burnaby Mountain was obscured by Mariner Hill in Coquitlam.

Three weeks elapsed with no feedback from the property. I work in the Telecom industry and I have contacts with Innovation, Science, and Economic Development Canada (ISED) and their



Figure 10 – Found the Source

spectrum management team. I presented to them my findings, and they were interested in finding the source, as it had the potential to interfere with more than just Amateur Radio. They decided to launch an independent investigation and made contact with the owner.

I met with the ISED representative and one of the property owners the following week, and very quickly determined the source. I already had an idea of what it was before we even gained access to the property, as I had found similar devices causing similar interference.

The device was a factory installed VHF/UHF television antenna with an integrated pre-amplifier on a recreational vehicle parked on the property. These antennas are commonly seen on RV's, boats, and some vehicles for receiving television signals over-the-air. What can happen is the pre-amplifier can go into a feedback loop, where the output of the pre-amplifier is not properly terminated, and the RF feeds back into the amplifier, and gets reamplified - caught in a feedback loop.

(Continued on page 75)

About the Author



David Cameron was first licensed as an Amateur Radio Operator in 1993 at the age of 17. As an avid electrical tinkerer and computer programmer, he built a computer controlled repeater controller for one of the University of BC Amateur Radio Society UHF repeaters from an old IBM 286 computer. Through that journey, he was mentored by several great experts in both software and RF hardware. This ultimately spawned into the Internet Radio Linking Project (<https://www.irlp.net>), which is still running today. It also taught him how to tune and modify surplus and end-of-life commercial hardware for use in the amateur bands - something he still enjoys doing today.

With a degree in Chemical Engineering from UBC and further education in Project Management, David worked for an international engineering consulting firm building training materials for process plant operators. After touring the continents, he decided to find a job closer to home. He took a role as a Project Manager for E-Comm 911 during the Next Generation Radio Program which upgraded the Lower Mainland First Responder radio network to P25 on 700MHz.

Combining the Project Management skills with his love for everything RF advanced his position to a Systems Engineer, responsible for designing and troubleshooting many of E-Comm's radio, network, and telephony systems. During the pandemic, David took on a project to rid the Public Safety band of several interference sources that were degrading the E-Comm radio network. During this project, several consumer devices were found to be causing interference similar to this story, including a baby monitor, TV amplified antenna, switching power supplies, LED lighting equipment, wireless broadcast microphones, and florescent light ballasts.

A similar phenomenon occurs when you put an audio microphone too close to its amplified speaker - you get an audible feedback “squeal”.

Once the power to the pre-amplifier was removed, the signal ceased. The owner of the RV mentioned he never uses the antenna, and didn't even know the antenna could do such things. He promised to remove the power to the antenna so this could not happen again. ISED will follow up with a letter to the owner to explain the situation and request the antenna be removed and destroyed so that it can not cause future issues.

As ham radio operators, we must do everything in our power to protect our limited spectrum from interference. This is just one example that had a positive outcome which came from good techniques, good communication, and professional conduct. I hope that other hams take some of the techniques learned here to find other sources of interference in your local area to keep the airwaves clear for our use.

~ David VE7LTD

Maximize your HF signal reception

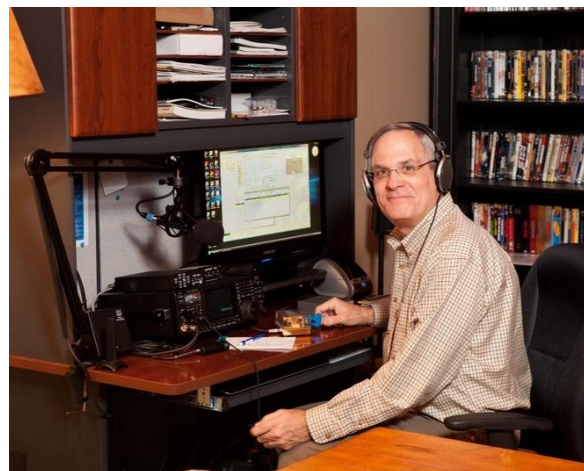
Learn how to adjust your HF radio to maximize your signal reception. Tim Kreth (AD4CJ) delivers a presentation based on a PowerPoint stack that he put together back in 2016. It was good advice then and it's good advice now!

The YouTube video is at: <https://youtu.be/git0w1zQIFE>

Time marks:

- [00:53 Mechanics of Fine-tuning your radio](#)
- [02:03 How to Fine-Tune Your Radio](#)
- [03:14 How to Zero-Beat CW Signals](#)
- [05:41 How to Accurately Tune a SSB Signal](#)
- [09:50 Automatic gain control & RF gain](#)
- [28:35 The use of preamps](#)

- [29:23 Attenuators](#)
- [36:45 Noise Reducer Circuits](#)
- [39:16 Noise Blanker Circuits](#)





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I continue to be amazed at the high prices being paid on E-Bay for original Ameco AC-1 transmitters but perhaps I shouldn't... they've been doing this for several years now.

Few radios that I can think of have elevated themselves to the cult status enjoyed by the AC-1, but the 3-tube [Knight Ocean Hopper regen](#) also comes to mind. Both radios typically reach \$100- \$200 on auction, with some going for much more. There were plenty of AC-1's sold and built over the years so it's not as if they're rare.

They seem to pop up frequently on e-Bay and the auctions are usually very spirited. I see a nice looking one at present, with 23 bids so far and now at \$150! I guess the timing is just about right, with a large supply of now-retired ex -50's Novices who once owned an AC-1, looking to turn back the clock and recreate their early radio experience.

As transmitters go, they don't come much simpler, but the well-

designed and smartly marketed radio made it extremely popular among the vast numbers of newly-licensed teenaged Novices who likely didn't have much spare change ... the first ones hit the market in the late 50's, right in time for the [strongest solar cycle on record](#), selling for \$14.95 in kit form. AC-1's continued to be sold into the early 70's with the price rising to around \$25... a nice long run for most ham gear. I may be wrong but I don't think they were ever available in anything other than kit form.

Here is what the kit looked like upon arrival ... this one still NIB in 2012!



courtesy: [WB1GFH's AC-1 site](#)



courtesy: <http://www.wa0itp.com/ac-1.html>

It's not difficult to imagine the level of excitement that this would have stirred up with a young Novice, eager to get on the air.

Even today there is still a large builder's interest in making AC-1 'clones'. Several years ago I decided to scratch-build my own clone and found that I had everything needed except for the gray hammertone spray paint which I found at Home Depot. Although most AC-1's used black chicken head knobs, some early models used maroon knobs so I decided to go with a red slide switch and red chicken head knobs on my reproduction. The important decal was available at the time from the Yahoo AC-1 group but I see them now being sold by [Radio Daze](#), for those that may want to try their hand at building a clone themselves.

The AC-1 uses the inexpensive 6V6 elevated from AF to RF duty, in a crystal-friendly Colpitts crystal oscillator. The only departure from the norm is the output circuit. Most inexpensive one-tubers end up with a link-coupled output but the AC-1 uses the more versatile pi-network ... something that no doubt added to its production costs but produced a transmitter able to load a wider range of antenna impedances while providing improved harmonic attenuation, both important in a beginner's rig.

My clone puts out 8 watts on 80m and 7 watts on 40m. Although never intended, doubling to 20m sees a large drop in efficiency, with output power dropping to 2 watts. Swapping to a 6L6 yields an extra couple of watts. Not enough to be noticed at the other end except when doubling or tripling.

I haven't had my clone on the air for awhile and think it's time to spark it up once again for some fun on 40m CW. It would be great to work another clone or even a real AC-1 if you have one, but any contacts will be exciting if you would like to try.

I'll be hanging around 7118 kHz or down near 7040 and... I won't be loud!

~ Steve VE7SL



NEW AMECO TRANSMITTER

- Pi-network Output circuit
- Includes Heavy-duty AC power supply
- 6V6 Oscillator and 6X5 Rectifier
- 15 watts input
- For 40 and 80 meters CW
- Crystal controlled
- Attractive grey hammertone finish with white lettering and red knobs
- Simple and Educational building instructions

The new AMECO transmitter kit is an ideal unit for the beginner or novice who requires a reliable transmitter. It is a high quality rig containing a heavy-duty transformer-choke power supply. It has a Pi-section output circuit to work into any random length of antenna wire. **NO ANTENNA TUNER IS NECESSARY.** Keying is clean and chirp-free. TVI suppression features have been included in unit. Kit is low in cost, simple to build, and easy to operate. Units are complete with punched chassis, hardware and instructions.

* Model AC-1 with coil kit for any 1 band, less tubes and crystal.....	\$16.95
Extra coil kit CK-1.....	.50
Set of tubes for above (6V6 & 6X5).....	2.13

80M ARDF Equipment

Always find the Source

80M Fox transmitter

Contact John for pricing and availability - JohnVA7XB@gmail.com
Cost CAD \$99 + Shipping

The new ARDF fox is a highly configurable transmitter with the following features:

- Configurable using a serial terminal through the USB port on a PC
- Configurable call sign identification, CW speed and repetition frequency
- Adjustable fox number from 1 sending “MOE” to 5 sending “MO5”
- Configurable transmission modes
 - Standard (10wpm, on 1 min, off 4 min)
 - Alternate (10wpm, on 1 min, off 1 min)
 - Sprint (10wpm, on 12 s, off 48 s)
 - Fast sprint (15wpm, on 12 s, off 48 s)
- Beacon mode sending “MO” at 10wpm continuously
- Spectator mode sending “S” at 15wpm continuously
- Low battery mode sending MOx once every 5 minutes
- Start of event timer configurable up to 120 minutes
- Start button to synchronize multiple foxes
- Optional short pre-event transmissions one hour before the event start with configurable CW speed
- Flashing LED showing status
 - waiting to begin delayed start – rapid flashing
 - running – on continuously
 - CW transmissions – flashing with CW timing
- Debug mode providing progress reporting via the terminal

Frequency: 3.579 MHz

Range: 300 m

Long Range (1300m) factory option available at extra cost
- Contact us

The TX80M manual is available at:
<http://www.rx80m.com/resources/ARDF-TX-Instruction-Manual---1.003.pdf>





No-Ham Recipes

John Schouten VE7TI

Opa's Pannenkoeken

When the grandkids sleep-over there is only one thing that they want for breakfast... that is Opa's Dutch roll-up pancakes. These are known as pannenkoeken in the Netherlands and there are hundreds of restaurants and stalls that serve nothing but them with a choice of dozens of fillings. They are very thin, almost a crepe, and can be served with a sweet or savory filling.

- 2 eggs (for extra rich batter use 3 eggs)
- 1 cup plain flour
- ½ teaspoon baking powder
- 2 tablespoons melted butter or vegetable oil
- 300 ml (1¼ cup) milk
- ¼ teaspoon salt
- ½ teaspoon baking soda

The most important step first... Separate the eggs by placing the yolks into your mixing bowl and the egg whites into a measuring cup. Set the egg whites aside for now.

Add the milk to your egg yolks and mix. Slowly add the flour to your egg and milk mixture so as to minimize lumps. Add the remaining ingredients except for the egg whites.

Allow the mixture to stand for half an hour if possible. Beat the egg whites until they form peaks, then fold them in to the batter.

Heat a skillet and coat it with a light layer of butter or oil to prevent sticking.

Use a ladle but only add enough batter to your skillet to form a thin layer, spread it evenly on the bottom by shaking the pan. Bubbles will form on the pancake as it heats. When it looks almost dry, flip it over and cook for another 30 seconds or so (don't cook it too long, you want it to remain soft and pliable).

To serve, add brown sugar or any other favourite filling and roll it up inside. Our kids prefer Nutella chocolate spread inside. Enjoy!

~ John VE7TI



Foundations Of Amateur Radio

Onno Benschop
VK6FLAB

The Internet of Digital Radio



To listen to the podcast,
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<http://podcasts.vk6flab.com/>
. You can also use your
podcast tool of choice
and search for my
callsign, VK6FLAB.

Full instructions on how
to listen are here:
<https://podcasts.vk6flab.com/about/help>

The topic of how radio evolves and embraces available technology is one that describes the hobby itself. From spark-gap through AM, SSB and FM our community picked up or invented solutions to make communication possible. When the internet came along it too became a tool ripe for picking and in 1997 a connection between a radio and the internet was made with the Internet Radio Linking Project or IRLP when Dave VE7LTD, a student at the University of British Columbia, joined the UBC Amateur Radio Society. Using a radio, some hardware and a computer, you could send audio between radios across the internet.

Since then this field has exploded with D-STAR, Echolink, DMR, AllStar, Wires, CODEC2, System Fusion and Brandmeister.

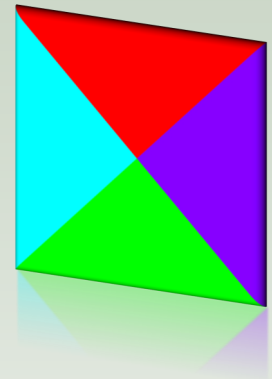
At a glance they're all the same thing, radio + internet = joy.

Looking closer there are two distinct kinds of internet radio contraptions, those where the radio is digital and those where it's not. IRLP is an example of an analogue radio

connecting to hardware that does the encoding into digital and transmission across the internet. At the other end the reverse process, decoding, happens and another analogue radio is used to hear the result. This encoding and decoding is done by a piece of software called a CODEC.

If we continue for a moment down the analogue path, Echolink, AllStar and Wires do similar things. In 2002 Echolink made its way onto the scene, similar to IRLP, but it didn't need any specialised hardware, any computer running the Echolink software could be used as both a client and a server, that is, you could use it to listen to Echolink, or you could use it to connect a radio to another Echolink computer.

AllStar, which started life in 2008 went a step further by making the linking completely separate. It uses the metaphor of a telephone exchange to connect nodes together, which is not surprising if you know that it's built on top of the open source telephone switching software Asterisk.



In 2012 or so, Yaesu introduced Wires which is much like Echolink and AllStar. There are servers with rooms, not unlike chat rooms, where you connect a node to and in turn your radio.

Blurring the lines between these technologies happened when you could build a computer that spoke both IRLP and Echolink at the same time. Now you can also add AllStar to that mix.

Essentially these systems do similar things. They manage switching differently, handle DTMF differently, use a different audio CODEC and handle authentication in a variety of ways, but essentially they're ways of connecting normal hand-held radios, generally FM, to each other via the internet using intermediary computers called nodes. Before you start sending angry letters, I know, there's more to it, but I've got more to tell.

While Dave was busy in Canada inventing IRLP back in the late 1990's, in Japan the Ministry of Posts and Telecommunications funded research, administered by the Japan Amateur Radio League into the digitisation of amateur radio. In 2001 that research resulted in what we know today as D-STAR. Two years later, ICOM started developing D-STAR hardware which resulted in actual physical radios less than a year later. Today you can get D-STAR hardware from ICOM, Kenwood and FlexRadio Systems.

Unlike the other technologies where the audio was converted at a central place, in D-STAR the audio is encoded in the radio and a digital signal is sent across the airwaves. That in turn means that the software that does the encoding, the CODEC, needs to be inside the radio. Since the information is digital right from the point of transmit, you can send other information, like GPS locations and messages along with the audio.

In 2005 DMR started life as a group of companies, now up to around 40, agreeing on some standards for digital audio in much the

same way as D-STAR. Mostly in use by commercial users, DMR has the ability to have two users simultaneously on-air using alternate channels by having separate time slots for each channel, alternating between the two of them. They agreed to use the same CODEC to ensure compatibility. Formal interoperability testing has been happening since 2010, but because DMR allows manufacturers to build in extra features many brands cannot actually work together on the same network.

For many years D-STAR and DMR-MARC, the DMR Motorola Amateur Radio Club World Wide Network, were the main digital radio systems around in amateur radio. That changed in 2013 when Yaesu introduced System Fusion. It too made digital audio at the radio, but it added a wrinkle by making it possible to have both analogue and digital audio on the same repeater. Depending on how the repeater is configured, analogue and digital radios can coexist and communicate with each other.

The Wires system that Yaesu rolled out was upgraded in 2016, renamed to Wires X and now also incorporates digital information to allow the linking of their System Fusion repeaters.

In 2014 at the Ham Radio Exhibition in Friedrichshafen in Germany, Artem R3ABM planned to make an alternative master server for DMR+ and DMR-MARC and the result was a German wordplay which we know today as Brandmeister. It acts as a network for digital radios in much the same way as DMR, but it's run as an open alternative to the commercially available options made by Motorola and Hytera.

The story isn't complete without mentioning one other development, CODEC2. It started in 2008 when Bruce Perens K6BP contacted Jean-Marc Valin, famous for the SPEEX audio compressor and David Rowe VK5DGR about the proprietary and patented nature of low data use voice encoders such as those in use in D-STAR, DMR and System Fusion. David had

All podcast transcripts are collated and edited in an annual volume which you can find by searching for my callsign on your local Amazon store, or visit my author page: <http://amazon.com/author/owh>. Volume 7 is out now.

Feel free to get in touch directly via email: cq@vk6flab.com, follow on twitter: [@vk6flab](https://twitter.com/vk6flab) or check the website for more: <http://vk6flab.com/>

If you'd like to join a weekly net for new and returning amateurs, check out the details at <http://ftroop.vk6flab.com/>, the net runs every week on Saturday, from 00:00 to 01:00 UTC on EchoLink, IRLP, ALLStar Link, IRN and 2m/70cm FM via various repeaters.

If you'd like to participate in discussion about the podcast or about amateur radio, you can visit the Facebook group: <https://www.facebook.com/groups/foundations.itmaze>

This podcast episode was produced by Onno (VK6FLAB). You can find more at <http://vk6flab.com/>

already been working in this area a decade earlier and started writing code.

In 2012 during Linux Conference Australia, Jean-Marc and David spent some time together hacking and managed to make a 25% improvement and CODEC2 was well under way. Today CODEC2 forms the basis of several projects including FreeDV in software, the SM1000 FreeDV adaptor in hardware and the roadmap for the future of open and free digital voice is bright.

I should mention that this information is specifically brief to give you an overview of the landscape and hopefully I've not made too many glaring errors, but feel free to drop me a line if you do find a problem.

Digital radio and the internet, it's not just a single mode, a whole cloud of modes, and I haven't even started with WSPR, FT8 or JT65.

~ I'm Onno VK6FLAB

What are the rules for calling CQ on a repeater?

When you finally get to the point of pushing the talk button on your microphone, after passing the test, receiving your license, getting your radio, building an antenna, digesting the manual, identifying a repeater, untangling its offset, programming those frequencies and keying up, you might be surprised to realise that you're lost for words. Something which I've talked about before.

Even if you do have something to say, finding a person to say it to will be the next big challenge. Truth be told, the more frequencies you have to choose from, the harder it seems to discover a fellow amateur and with Internet connected repeater networks, your choice appears infinite.

So, how do you initiate communication on a repeater? Do you call CQ, ask for a signal check, or just kerplunk the repeater to prove that your signal is getting in?

The very first thing to remember is that you have the exact same rights as every other amateur. No amateur is above any other, though hearing some conversations or responses might give you a different impression.

Before you embark on a long speech, what you need to remember is that your ability to receive is not usually the same as your ability to transmit. If you're using a low-powered hand held radio that's tuned to a local repeater, you might be comparing your little stubby antenna, inside

your home, held at an angle, with that of a high power repeater, with a high-gain antenna bolted to a tower installed on the top of a hill. In other words, you can hear the repeater much better than it can hear you.

You'll quickly observe that there are amateurs about who have their radio on all day long and they'll often hear every single transmission that hits the local repeater and even random frequencies. Sometimes this means that you'll have a great friend to talk to, other times it means that you'll have a local troll who in their not so humble opinion determines what is permitted and what's not.

So, to get things rolling, you should follow the KISS principle, an aim championed by the lead engineer of the Lockheed Skunk Works in 1960, Kelly Johnson, "Keep it simple stupid."

With keeping things simple, there is a fierce and ongoing debate around the use of the phonetic alphabet on a repeater. With the benefit of experience, having run a weekly radio net for over a decade I'm going to be blunt. When you're identifying yourself to the rest of the community, always use phonetics. Only if you've been acknowledged and you're part of the conversation should you even consider dropping your phonetic callsign.

The reason is that your first transmissions will be regularly interrupted by others since they're having a conversation and you'll be butting in. Even if a net controller asks for check-ins, you should use phonetics, since you might not be the only one who keys up at the same time. If you and the controller have known each other for years and they recognise your voice, you could consider dropping the phonetics, but don't expect everyone to know who you are from a single letter getting through. Some people are better at this than others.

Whatever you do, don't barge in with a whole story until you've been acknowledged and the microphone has been handed to you. After all, this is a public shared space.

The next thing to consider is the audience you're talking to. If the repeater is just local, then the people within range are likely to expect your prefix

and know who you are, so just your call might suffice, but if you connect to a network, that's not likely to be true. If you want to actually talk to anyone, you can call CQ, but if you just want to let people know you're there, you can say your callsign followed by the word "listening".

If you want to speak with a specific individual on the other hand, you can call them using their phonetic callsign, either with or without the CQ. Also consider they might be on the other side of their shack working hard at attempts to avoid sniffing solder fumes and take a moment to get to the microphone.

In other words, what you say on your repeater depends on what result you want and who else is there. Sometimes there will be a mismatch between the two, just saying your callsign might initiate an hour long conversation, and calling CQ might give you the local troll telling you to go away.

Don't let that dissuade you. Even with years of practice, sometimes the results are unexpected.

Talking on a repeater is like being invited to a party. There are going to be people you know, people you want to know and people you never want to meet again.

So, be considerate, listen more than you talk and be deliberate in your intentions and you'll be fine.

Thanks to Sandip EI7IJB for the question, "What are the rules for calling CQ on a repeater?" If you have other burning questions, get in touch and ask. I'll try to give you a coherent answer.

~ I'm Onno VK6FLAB



KB6NU's Column

Dan Romanchik, KB6NU

Five mistakes to avoid when buying a low-cost scope

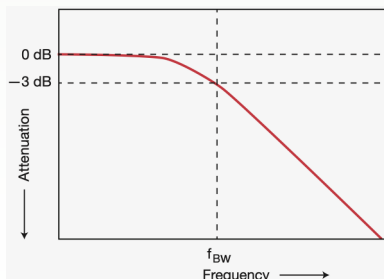


Keysight has a new application note—[5 Common Mistakes to Avoid When Buying a Low-Cost Oscilloscope](#)—that you might want to get if you're going to buy a scope, or even if you use a scope. This free app note covers the following five topics:

- selecting an oscilloscope with insufficient bandwidth
- settling for a USB oscilloscope
- underestimating usability
- running the risk of equipment support difficulties
- focusing solely on specifications

Make sure you have enough bandwidth

A scope's bandwidth is the frequency at which the input signal sine waves attenuate by -3 dB (30%) as shown here:



From a practical point of view, what this means is that if you need to measure the amplitude of a 146.96 MHz signal with some accuracy, don't settle for a 150 MHz scope. The amplitude measurement at that

frequency could be up to 30% off. You'll probably want to purchase a scope with at least 200 MHz bandwidth to make that measurement.

And, when measuring digital signals, having a scope with a high bandwidth is especially important. The reason for this is that while a digital signal may have a relatively low frequency, they contain higher frequency components. Keysight recommends choosing a scope with a bandwidth at least five times the highest clock rate in your system.

Don't settle for a USB scope

USB scopes are generally cheaper than stand-alone scopes with similar specifications, but remember that you'll need a computer to provide the user interface. For one thing, it's not going to be as portable as a stand-alone scope. USB scopes have their place, but probably not for general-purpose use.

Don't underestimate usability

Even if you only use a scope occasionally, or perhaps especially if you only use a scope occasionally, consider the usability of the scope you intend to buy. Keysight

notes that there are several factors contribute to an intuitive and detailed graphical user interface (GUI). These include display quality, display size, resolution, update rate, viewing angle, color versus monochrome, and user-specified display modes such as variable and infinite persistence. Additionally, a multi-language GUI can better contribute to the user's interaction with the oscilloscope. Ideally, you'd like to be able to play with a scope for a while before buying it.

Make sure that you can get support

Before you plunk down your cash, make sure that you can get support should the scope you buy be DOA or fails after you start using it. Research the support and services offered by the vendor before buying to avoid these issues. A cheap scope with little or no support is not a bargain.

Don't focus solely on specifications

Keysight warns, "Specifications do not tell the whole story. You need to dig deeper, read between the lines, and ask questions when researching oscilloscopes to select one that best fits your needs."

Ask your friends what kind of scopes they have and if they like using them. You can also head over to the EEVBlog Test Equipment Community Forum. It now has more than a half million posts (!), and test equipment nerds from all over the world hang out there.

This is just a quick review of the Keysight app note. I'd suggest that you download and read the entire thing before buying your next cheap scope.

~ Dan KB6NU

When he's not trying to figure out which way current flows, Dan blogs about amateur radio at KB6NU.com, teaches ham radio classes, and operates CW on the HF bands. Look for him on 30m, 40m, and 80m. You can email him at cwgeek@kb6nu.com.

How is this for distracted driving?



If you are on 20 meters around 1500Z or 40 meters around 0300Z, chances are you will bump into WW9R. He operates CW from his pickup truck during his drive to and from school. During his mid-day travels, he can be found on 20 meters as well. He monitors XX.028 looking for other CW ops members and will scan the bottom 25 kHz of the bands. He has been operating mobile CW since the summer of 2008. [Mobile HF CW \(ww9r.com\)](http://Mobile HF CW (ww9r.com))



~

HAM LEFTOVERS...

Morsle

Hey, this is a pretty neat little program, like Wordle but with CW, a different word every day.

In [morsle: The daily Morse Code challenge](#), you have 21 tries to guess the word, which will be played out loud in Morse Code. You can also go to practice mode for unlimited words or callsigns.

How to make a microphone... from a face mask

The results won't be high fidelity, but you can definitely turn sound into electric signals using an N95 and some physics knowledge. There are different kinds of microphones, but they all do about the same thing, which is to turn acoustic sounds into electronic signals that can be amplified, modified, or recorded. [How to Make a Microphone ... From a Face Mask | WIRED](#)

Read older electronics magazines of all kinds...

If you are interested in older magazines dealing with our hobby, electronics and the like, you will enjoy [RADIO / BROADCAST HISTORY LIBRARY: Thousands of magazines & Publications ALL FREE \(worldradiohistory.com\)](#). I even read some magazines that I remembered reading when I was a teen... and that was a long time ago!

IARUMS newsletter - Military intruders in ham radio bands

IARU Monitoring System (IARUMS) Region 1 newsletter reports during March, likely as a consequence of the current military situation, they noticed an increase of transmissions in unknown modes in HF amateur radio bands. In many cases, their most probable function was to act as jammers (signals intentionally transmitted over other transmissions in order to disrupt or nullify their reception). More information at [IARUMS newsletter - Military intruders in ham radio bands | Southgate Amateur Radio News \(southgatearc.org\)](#)

Not Your Average Special Event: "Meme Appreciation Month"

This event was originally spurred out of nothing other than an inside joke with a group of friends from both the Young Amateurs Radio Club and the Amateur Radio Operators of Canada discord server. But I however took it to the next level and filled out the application for a special event call sign on New Year's Day. Once I shared the newly approved call around, a handful of other Amateurs decided they wanted in on the fun. To us, this event is a way to express our group's feelings that special event call signs don't have to be "so serious". We want to show the goofy side of the hobby, something that could click with youth to potentially bring them in the hobby. [Not Your Average Special Event: "Meme Appreciation Month" \(rac.ca\)](#)

More Ham

Radio amateurs in court

Lewis M3HHY has released a video that takes a look back at the UK radio amateurs who were prosecuted during World War One.

Among them is Archibald George Cocks who, in December 1914, was given a sentence of six month imprisonment for processing a largely dismantled radio which didn't even have any antenna. Also mentioned in the case was his procession of a Morse buzzer which he and his wife had been using to keep up their Morse practice.

Read the letter concerning the plight of Archibald George Cocks sent by the Birmingham Wireless Association on PDF page 47 (WW p653) in January 1915 Wireless World at <https://worldradiohistory.com/UK/Wireless-World/10s/Wireless-World-1915-01-S-OCR.pdf>

Following his sentence Archibald wrote to Wireless World, see PDF page 50 (WW p722)

of February 1915 issue at

<https://worldradiohistory.com/UK/Wireless-World/10s/Wireless-World-1915-02-S-OCR.pdf>



Watch Radio Amateurs In Court!

~ Southgate Amateur Radio News

Elizabeth Baggoo VE7TLK & VA7TK is a Silent Key



Elizabeth was a very active member of NSARC for many years as a champion for women hams as well as in CLARA-YL, a Canadian organization that promotes women's amateur radio activities. See her presentation on [YL Amateur Radio Operators](#). Her obituary is at:

<https://vancouverunandprovince.remembering.ca/obituary/elizabeth-baggoo-1085030096>

Elizabeth was a mentor to many YLs and XYLs , had a great radio shack, and was a member of ORCA. She will be missed. ~



Hello BCQP 2022 participants

This is a general mail-out to advise everyone that the BCQP Report for this year's event has been uploaded and is available for viewing at http://orcadxcc.org/content/pdf/bcqp/BC_QP_2022_report.pdf

The report includes the usual behind-the-scenes perspective from my vantage point as contest coordinator as well as detailed number-crunching and analysis of QSO data from submitted logs.

The report is more like a manuscript — yes, I admit it — so to keep the report to a somewhat manageable length, the results section has been abridged. All BC results are listed as this only fills a couple of pages. But the outside-BC results section shows only certificate and plaque winners. Note: Award eligibility requires at least 10 valid QSOs.

For a complete listing of line scores — not updated after initial announcement, yet, SRI — follow these links:

BC: http://orcadxcc.org/content/pdf/bcqp/2022_BCQP_BC_scores.pdf

Outside

BC: http://orcadxcc.org/content/pdf/bcqp/2022_BCQP_outside_BC_scores.pdf

Certificates will go out as they are ready. This year, due to the high number of certificates that will be awarded and the rather high cost of postage, we have to go digital to keep expenses down. Each certificate winner will receive a separate email with a link when the certificate is ready to download. A PDF offers many advantages over snail-mailing anyway: can print out, or not; can use as a desktop or homepage background; arrives faster than snail-mail; won't get bent in the delivery process.

The plaque order will go to the plaque-maker next week, and plaques will be snail-mailed when ready since they are obviously not email-able. □

My thanks to everyone who participated in BCQP 2022. Let's do it again in 2023. And bring your friends. The more, the merrier.

73,

~ Rebecca VA7BEC
BCQP Contest Coordinator



Radio Amateurs of Canada



In 2022, Canada is celebrating the Platinum Jubilee of Her Majesty Queen Elizabeth II, marking her 70th anniversary on the Throne. She is Canada's longest reigning Sovereign and the first to celebrate a platinum jubilee.

To mark this historic milestone, a series of initiatives are taking place throughout Canada to honour The Queen's service and dedication to this country and celebrate Canadian achievements of the last seven decades.

Innovation, Science and Economic Development Canada has approved the use of special call signs from May 15 to July 14. These dates correspond to the early summer busy operating season and will be available to all Canadian Amateurs who wish to use the special call signs on all occasions in including Field Day, the June VHF Contest, the RAC Canada Day Contest and the IARU World Championship.

To use the special call sign, substitute the prefix normally assigned to your province or territory by the special prefix.

For example, VE3 becomes VX3, VA7 becomes VG7, and YV2 becomes XK2, and so on.

For more information on the Platinum Jubilee visit:

<https://www.canada.ca/en/canadian-heritage/campaigns/platinum-jubilee.html>

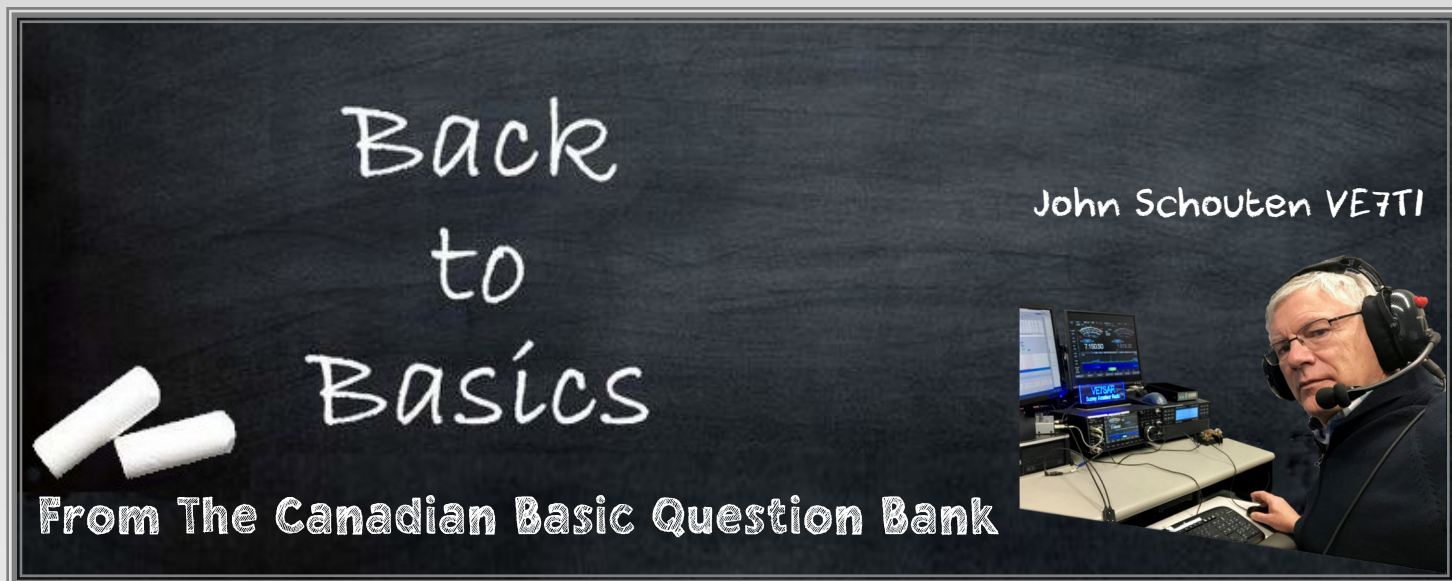
Surrey ARC's "The Communicator"

I am very pleased to be on the email list for "The Communicator", which is an outstanding publication generously provided for free through the efforts of a group of volunteers of Surrey Amateur Radio Communications (SARC). The bimonthly publication varies in length and it's March-April 2022 issue had 130 pages of very interesting articles from around the world – some historical, some technical and some general interest. You too can be a recipient of this wonderful publication. You can download it from the SARC website at <http://ve7sar.net/>.

As always, if you have any comments, please contact me at vy1kx@rac.ca.



the [July-August 2022](#) issue of *The Canadian Amateur*, the electronic TCA (eTCA) version of the March-April 2022 TCA is now available for viewing or download for RAC members.



Some frequently asked questions and encryption

Q: I am the holder of an Amateur Radio Operator Certificate. Does this allow me to operate other radio transmitters?

An Amateur Radio Operator Certificate provides authority for the use of radio transmitters operating within the Amateur Radio Service. The use of transmitters operating within other radio services may require additional certification and/or licensing.

Q: I am the holder of an Amateur Radio Operator Certificate with basic qualifications. May I install and operate an automatic repeater?

You may install and operate a repeater receiving on one frequency band while transmitting on another (Cross-Band); or that transmits and receives alternately on the same frequency (simplex store-and-forward). You must only utilize frequencies available for your qualification. However, the installation and operation of a repeater receiving on one frequency while transmitting on another within the same radio frequency band is restricted to holders of an Amateur Radio Operator Certificate with advanced qualifications.

Q: I am going to be moving outside of Canada and will no longer have a valid Canadian address. How does this affect my Amateur status?

As per the document RIC-9: Call sign policy and special event prefixes, call signs are assigned based on your geographical area in Canada. If you do not have a valid address in Canada you may not be assigned, nor may you retain, a Canadian call sign. Your call sign must be released. Your Amateur Radio Operator Certificate remains valid for life. Should you return to operate in Canada, and have a valid Canadian address, you may apply for a new call sign without having to re-take the examination.

Q: I am planning a visit to the USA, can I use my amateur radio station while visiting?

Under the Canada/USA reciprocal agreement: Treaty Series 1952 No. 7: Operation of Certain Radio Equipment or Stations (Convention between Canada and the United States of America), persons holding appropriate amateur authorizations, issued by either country, may operate their stations within the



territory of the other country subject to some restrictions and identification requirements.

Q: I am going on vacation in Europe, and would like to operate my amateur radio station from the various locations that I visit. Am I allowed to do this?

Canadians can obtain a CEPT permit, issued by Radio Amateurs of Canada (RAC), that allows for the operation of their station within countries participating in the CEPT agreement. Further information is available from the document RIC-3: Information on the Amateur Radio Service and from the RAC website. If the country does not participate in the CEPT agreement you must obtain permission from the country's administration prior to operating your station.

Q: I am making a trip by boat to another country. Do I have to use a VE0 call sign when in international waters or can I use my home station call sign?

You may use your home station call sign when in international waters without any problems. You may also obtain a VE0 call sign. As per the document RIC-9: Call sign policy and special event prefixes, the VE0 call sign can ONLY be used when a vessel is within international waters.

Encryption on Amateur Radio

And now for the subject of encryption... There have been several recent RF technologies in the Amateur Radio bands that enable the transmission of data such as email and web content. ISED was asked to provide answers to questions that have arisen as a result. The topic relates to several questions in the Canadian Basic Amateur Radio Question Bank, one of which appears on almost every exam.

B-1-7-6 When may an amateur station in two-way communication transmit an encoded message?

A. During contests

B. When transmitting above 450 MHz

C. Only when the encoding or cipher is not secret

D. During a declared communications emergency

Article 47 of the Radiocommunication Regulations states "A person who operates radio apparatus in the amateur radio service may only (b) use a code or cipher that is not secret".

Q: I am experimenting with the [Amateur Radio Emergency Data Network \(AREDN\)](#). Am I required to filter out streaming video, music, broadcast news, etc. from any AREDN access points that I might set up? Or is it enough for me to tell users that this is illegal?

ISED: If you are the one operating the AREDN gateway, you would be responsible for the content that gets passed through it on that end. It would be advisable to filter if available and to also advise users of what types of content are allowed.

Q: Many emails are in support of industrial, business or professional activities. Many other emails include music, commercially recorded material, and material that originates from a broadcast undertaking. Am I required to police email sent via amateur radio (AREDN, WinLink, etc.) in any way? Or is it enough for me to tell users that they must not use email for any of those purposes... which will surely be ignored, as I am sure you realize?

This would follow the same requirements as the answer to the previous two questions.

Q: You have not addressed the issue of encryption. Most of the internet is encrypted without a published key. Am I permitted to create an AREDN gateway or other Amateur Radio based data transmission that could transmit HTTPS material, or am I required to filter out HTTPS material? In addition, I am looking for clarity on whether ISED considers the transmission of encrypted HTTPS material (which is 90% of the web) on

amateur radio frequencies to be a legal activity. This is critical to your saying email is acceptable because all major email services (gMail, Hotmail, etc.) require encryption—without a published key.

ISED: For encryption, as per section 47(b) of the regulations, a person who operates radio apparatus in the amateur radio service may only use a code or cipher that is not secret. This is interpreted to mean that such encryption is not permitted.

Therefore, the correct answer to our sample question:

B-1-7-6 When may an amateur station in two-way communication transmit an encoded message?

C. Only when the encoding or cipher is not secret

Article 47 of the Radiocommunication Regulations states "A person who operates radio apparatus in the amateur radio service may only use a code or cipher that is not secret".

~ John VE7TI



Do you need more information about our courses?

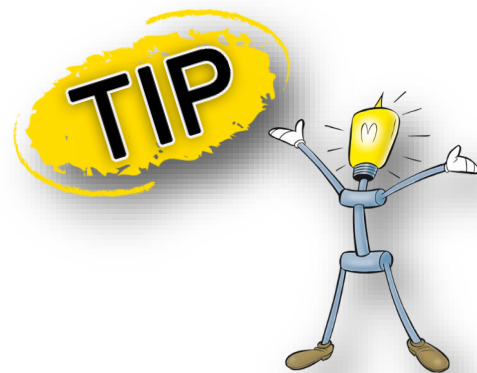
Study Links for more information

Whether you are new to the hobby or brushing up on skills, you should find these study links helpful:

1. RIC-7 is the entire up-to-date Industry Canada (IC) Basic Question Bank.
<http://tinyurl.com/CanadaBasicQB>
2. Industry Canada (ISED) on-line practice page:
https://apc-cap.ic.gc.ca/pls/apc_anon/apeg_practice.practice_form
3. The Amateur Radio Exam Generator is at:
https://www.ic.gc.ca/eic/site/025.nsf/eng/h_00040.html
4. The ExHaminer Study software for Windows is at: <https://wp.rac.ca/exhaminer-v2-5/>
5. VE3YT has an excellent question-based guide available at ve3yt.com

Contact SARC if you wish to write the Basic or Advanced Exam. If you pass we'll even give you a year free as a SARC prospective member!

Newly Licensed? When you receive your paper license in the mail, it will come with a form that can be filled out and mailed to the Radio Amateurs of Canada office, at which point an introductory RAC one-year membership will be set up. Introductory memberships are identical to our existing basic memberships and you will receive The Canadian Amateur magazine for one year.



HAMpuzzle V1.2

Our new students are often confused by the block diagrams for receivers and transmitters. A freeware program to practice assembling block diagrams for the Canadian Amateur Radio Basic certification exam runs under Microsoft Windows (but also works flawlessly on Ubuntu 10.04 + Wine 1.2.2)

HAMpuzzle V1.2 (2014 04) <https://www.rac.ca/wp-content/uploads/2014/04/HAMpuzzle/HAMpuzzle12.zip>

Be sure to download at least one set of Diagrams from the web page and deposit the bank(s) in the same folder as the program. For Basic:

https://www.rac.ca/wp-content/uploads/2014/04/HAMpuzzle/HAMpuzzle_Diag_Basic.zip

Radio Amateurs of Canada is pleased to make the HAMpuzzle© program available and extends sincere thanks and congratulations to François Daigneault, VE2AAY, for writing and providing it as freeware to anyone wishing to download it.

~ RAC

Course update...



Kevin McQuiggin VE7ZD/KN7Q
instructing the SARC CW class in
the art of developing a good 'fist'.

We are now well into our third Basic course of 2022, again with a full on-line class of students. Average scores have climbed since we started teaching on-line. Here are the statistics for 2021 and 2022:

The total students over 4 classes in 2021 was 196 with an average mark of 85-90%; and the total student total for 2022 over 3 classes (so far) is 145 with an average mark of 92%. So either the students are getting smarter or we instructors are getting better ;-)

We have also started our first CW course since COVID struck and forced us to leave the classroom. We have about 20 students participating including 4 who asked to join on-line. We have found that audio problems in Zoom, caused by their software that tries to eliminate echoes, affects the copyability of CW. Therefore we will likely eliminate the on-line option for future CW courses unless we find a work-around.

We are also developing a better Morse code oscillator. Our MFJ oscillators use a square wave pattern that produces a raw sounding tone that can be quite annoying. Additionally, the very inexpensively made keys often make a poor contact that can mis-shape the characters that students send. That leads to frustration and a more challenging learning experience. Our oscillators will be included in the next issue of The Communicator as a build project.

~ John VE7TI

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Next course starts September 19, 2022—contact sarc@ve7sar.net

Includes classes, a comprehensive manual, videos and the exam fee



- Ideal for outdoors activities. Long range communications anywhere for free without commercial infrastructure
- Use satellite communication to speak around the world, perhaps even to an astronaut
- Participate in 'Radio Sports' like Contesting and Hidden Transmitter Hunts
- Enhance your personal and your community's preparedness in an emergency
- Use a radio, computer, smartphone or tablet for free worldwide voice and digital communications
- Practice an exciting hobby or start a career opportunity

SOLDER SPLATTER

John Brodie VA7XB



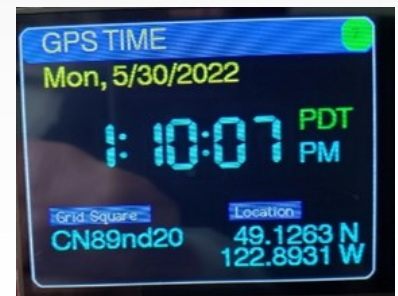
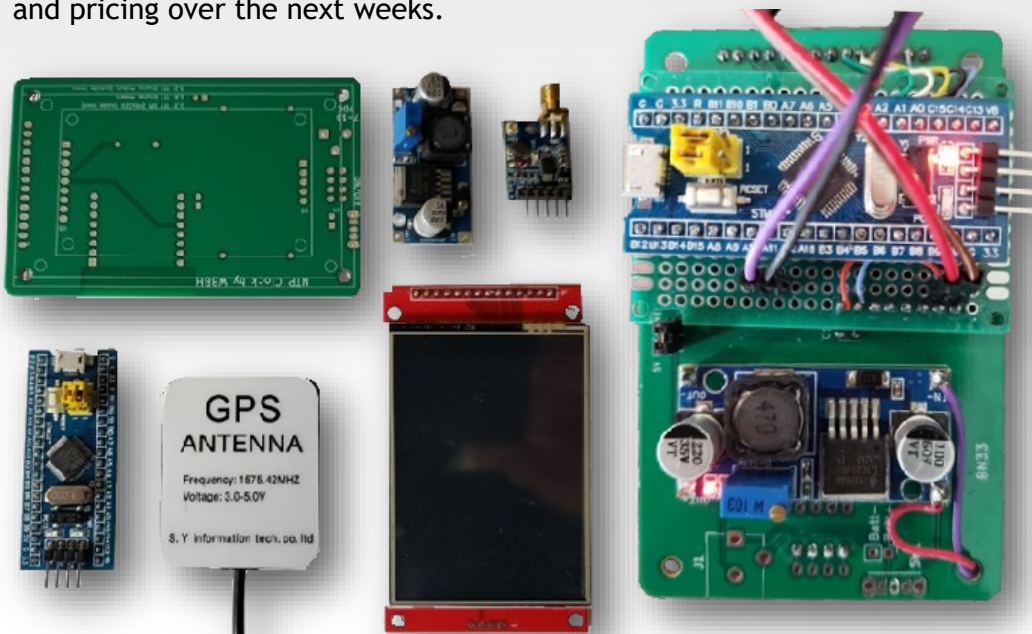
Member Project #1: A GPS/Clock

An ardent builder of electronic and ham radio projects, Dino VE7NX/VE7XDT, describes below a fun and useful project that will appeal to both beginner and expert. No surface mount or difficult soldering or assembly procedures are involved as all components are pre-mounted.

Parts will be purchased and assembled ready for a Fall project build at our Ops Centre, once the number of participants is known. Cost is expected to be under \$65 but will depend somewhat on parts availability and pricing over the next weeks.

If you wish to build this project for yourself, please email John VA7XB at va7xb@rac.ca then follow up by sending \$65 payable to SARC using the Paypal “donation” button at the bottom of the Join/Donate page at www.ve7sar.net. Include in your email proof of payment no later than July 15th as ordering will be done shortly thereafter.

The unit runs on 12v, has a 2.8 inch colour graphic touch screen utilizing a 32 bit microprocessor, Buck 12v to 5v converter and passive or external GPS



antenna, all mounted in an attractive custom plastic box (yet to be designed).

Several screens changeable by touch will display from the satellite signals:

- Date and accurate local and UTC time in hours, minutes, seconds
- latitude and longitude to 5 decimals
- Maidenhead grid square accurate to 8 figures
- Altitude, speed and azimuthal direction of travel

Full credits go to the designer, Bruce W8BH, whose [website](#) describing this and other great projects can be found at Amateur Radio Station W8BH . Thanks also to Dino for his willingness and enthusiasm in making his slightly modified GPS/clock project available to SARC members.

~ The foregoing as told to John VA7XB



Member Project #2:

2m offset attenuator and tape measure yagi for Foxhunting



Whereas our annual foxhunts were traditionally on 2m, more recently we have moved on to 80m utilizing receivers (RX) and foxes (TX) designed by Les Tocko VA7OM. However, there is still lots of interest in 2m as most of us own a VHF transceiver, which can be put to good use along with a directional antenna.

With both 80m and 2m, an attenuator is necessary to reduce the signal strength and avoid overloading the RX when getting close to the fox. Whereas the 80m RX has an attenuator built in, the 2m RX requires an external attenuator,

which should also “offset” receive frequency for reasons which have been explained in previous articles.

Les has offered to lead a member construction project of:

- a) 2 m directional antenna and
- b) an off-set attenuator which can be mounted on the antenna.

Currently proposed is a 5 or 6 step attenuator as shown below. The antenna is constructed from cheap PVC ½” pipe and integrated with the attenuator built into the antenna “boom”.

For the offset attenuator, Les will obtain all necessary parts, populate the boards with surface-mount components and assist members in putting it all together.

The two projects would normally be built together. Many options are available but here is a good one which makes use of a surplus tape measure and a metal box for the attenuator: <http://trbo.org/otwc-net/no7rf/thunt/tape.pdf>.

Or watch this video: https://www.youtube.com/watch?v=7WZZrXV-RY4&ab_channel=NorthCountryHam

More information on use of the 2m attenuator and yagi: https://www.youtube.com/watch?v=KGQDQZT9IRQ&ab_channel=DEFCO NConference

Shown are two examples of the final product using a metal case for the attenuator but the project proposed by Les would utilize the attenuator

built into the boom as shown on the previous page.

The cost is expected to be: \$20 to \$25 for the attenuator and \$12 to \$15 for the antenna, both costs depending on quantity.

If you wish to get on board with these projects, which are planned for the Fall of 2022, please advise John VA7XB by email: va7xb@rac.ca no later than July 7th. Payment will then be requested by July 15th so that the necessary materials can be ordered and be available by early Fall.

When replying, please specify if you wish to build

- a) the attenuator
- b) the tape measure beam, or
- c) both

~ John VA7XB



We're in the lab researching a pure sine wave code practice oscillator that we plan to initially offer to our CW course students. If there is sufficient demand we will also assemble additional parts kits for others. The cost is expected to be less than \$25.

We have been dissatisfied with our MFJ oscillators because of their scratchy code and the unpleasant square wave tone. This project promises to fix that.

More in the September-October issue of The Communicator.

JULY 2022

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	For details on all SARC events, go to ve7sar.net				1 Canada Day Contest: RAC Canada Day (CW, SSB)	2 Coffee: 0700-0830 Denny's 6850 King George Blvd., Surrey
3	4 On-line Basic Course 19:00 hrs	5 1930 SEPAR Net 2000 SARC Net	6	7	8	9 Coffee: 0730-0930 Denny's OTC Open—10- Noon Basic Course (Antenna Workshop)
10 Vancouver Bike-A-Thon radio volunteer opportunity	11 On-line Basic Course 19:00 hrs	12 1930 SEPAR Net 2000 SARC Net	13 SARC—SEPAR Social Meeting (OTC) 1900-2100	14	15	16 Coffee: 0730-0930 Denny's OTC Open—10- Noon Basic Course (Antenna Workshop)
17	18 On-line Basic Course 19:00 hrs	19 1930 SEPAR Net 2000 SARC Net	20 1900 SARC Exec Meeting	21	22	23 Coffee: 0730-0930 Denny's OTC Open—10- Noon RARC Swap Meet
24/31	25 On-line Basic Course 19:00 hrs	26 1930 SEPAR Net 2000 SARC Net	27	28	29	30 Coffee: 0730-0930 Denny's OTC Open—10- Noon

Contest Details: <http://hornucopia.com/contestcal/contestcal.html>

AUGUST 2022

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1 BC Day On-line Basic Course (Review) 19:00 hrs	2 Basic Course (Exam @ OTC) 18:00 hrs 1930 SEPAR Net 2000 SARC Net	3	4	5	6 Coffee: 0730-0930 Denny's 6850 King George Blvd., Surrey OTC Open: 10-Noon Basic Course (Exam @ OTC) Contest: NA QSO Party
7 Contest: NA QSO Party (CW)	8	9 1930 SEPAR Net 2000 SARC Net	10 SARC Social Meeting (OTC) 1900-2100	11	12	13 Coffee: 0730-0930 Denny's OTC Open: 10-Noon Contest: WAE Contest (CW)
14 SEPAR Cruise-In (2-4 PM) Contest: WAE Contest (CW)	15	16 1930 SEPAR Net 2000 SARC Net	17	18	19	20 Coffee: 0730-0930 Denny's OTC Open—10-Noon Contest: NA QSO Party (SSB)
21 Contest: NA QSO Party (SSB)	22	23 1930 SEPAR Net 2000 SARC Net	24	25	26	27 Coffee: 0730-0930 Denny's OTC Open—10-Noon
28	29	30 1930 SEPAR Net 2000 SARC Net	31 1900 SARC Exec Meeting	<div>For details on all SARC events, go to ve7sar.net</div>		

Contest Details: <http://hornucopia.com/contestcal/contestcal.html>

separ Mobile Cruise-In

Show Off Your 'Perfect' Mobile Radio Installation

Hosted by Surrey Emergency Program Amateur Radio

Our first (annual?) Mobile Cruise-In is scheduled to take place on Sunday, August 14 From 2 to 4 PM, at the A&W Restaurant parking lot at 2725 192 Street, Surrey, BC [\[map\]](#), sponsored by the Surrey Emergency Program Amateur Radio (SEPAR).

Many Amateur Radio licensees have home stations where the hobby is practiced for fun, contacting similar stations all over the globe, but the hobby has a serious side as well. We provide emergency communications where all other systems, such as cell phones or even radio towers fail. Many of us have mobile stations (in compliance with distracted driving regulations) that permit us to operate wherever and whenever. Mobile Amateur Radio is not restricted to cars and trucks but bicycles, even pedestrians and equestrians.

This type of broad-based community availability requires no commercial infrastructure, hence the slogan: "Amateur Radio works when all else fails". This has been shown time and again all over the world.

SEPAR would like to host a first ever event of its kind locally. We have a

commitment from the Surrey Fire Service and I expect that support from our contacts at the Surrey RCMP (or Surrey Police Service) to judge the entries. Prizes will be awarded for the neatest installation and the most bands covered.

The idea for this local event originated with the Portage County Amateur Radio Service (PCARS), a Wisconsin group who have been doing the Mobile Cruise-In for twelve consecutive years. Their turnout varies with the weather, but in past years they've had 50 or more entries. In addition to the entrants and Amateur Radio spectators, we welcome members of the public to stop by and check out the goings on. They say that it's a great way to generate some exposure for Amateur Radio and our emergency programs.

We appreciate the support of the A&W restaurant at that location but, if you are not an A&W fan, there are several other refreshment options adjoining the same large parking lot.

So polish up your mobile rig, dust off your Grab 'n Go kit and come show it off at the 'Cruise-In'

~ John VE7TI



12th Annual Mobile Cruise-In 2021

So you think that you have one of the best amateur radio mobile installations to be found? Well here is your chance to show off that mobile rig and have the opportunity to compare it to dozens of others: HF, VHF, UHF, you name it.

Thursday, August 12, 2021, 6:00 - 8:00 pm

The Portage County Amateur Radio Service (PCARS) will be sponsoring the **12th annual Amateur Radio Mobile Cruise-In** Night at the **A&W Restaurant - 769 East Main Street in Ravenna.**

Hams from all over Northeast Ohio will be cruising in to check out the wide variety of mobile radio setups and get some ideas for their own vehicles.

Prizes awarded for:
1st Neatest Installation
2nd Most Bands Covered

Enjoy an evening of ham radio fellowship and fun and get to know other hams from throughout the area.

More information contact Nick, AC8QG, at President@portcars.org

PCARS AMATEUR RADIO

Portage County Amateur Radio Service, Inc. (PCARS) The RADIOGRAM August 2021 Page 40 of 57



SURREY EMERGENCY PROGRAM AMATEUR RADIO

Mobile Cruise-In

Show Off Your 'Perfect' Mobile Radio Installation

Sunday, August 14, 2022—2 to 4PM

Your Grab 'n Go Kit: Vehicle, Equestrian, Marine, Pedestrian, or ?

A&W Restaurant Parking Lot, 2725 192 Street, Surrey, BC



So you think that you have one of the best amateur radio mobile radio installations to be found? Ready for any emergency call? Here's your opportunity to show off that great mobile station and compare it to others... VHF, UHF, HF or?

- Get some ideas for your own kit or vehicle
- Find out what works for others (and what doesn't)
- Prizes for the neatest installation and most bands covered

Enjoy a fun afternoon with your fellow hams
over an A&W root beer and A&W's great food and beverage menu



Local Ham Gear For Sale

More listings at hamshack.ca



For sale is a **Kenwood matching speaker** (blue-grey), model SP-70. The Kenwood SP-70 is a great addition to your TS-400 or the TS-700A series transceivers. It features a 4.75 inch speaker element and can handle up to 2.5 Watts. This 8 ohm speaker has a frequency response of 300 to 5000 Hz. The rear panel has screw terminals. Measures 6.5 x 4.875 x 7.875 inches 3 lbs Asking \$50

Contact: John VE7TI ve7ti@rac.ca



Do you have multiple radios, mics or speakers? Would you like to patch them all to one audio source or output? The [ProCo 148 PatchMaster](#) is a 24-channel A-B audio patch bay.

Connect your various radio outputs and inputs, even your foot pedal and simply jumper them with a 1/4" patch cable to select between each. I used it between 3 transceiver speakers, 2 computers, 3 mics, my foot pedal and selected either my speaker, one of 2 headphones or all three. Each individual jack in this patch bay can be configured. 24 separate channels (48 configurable ins and outs). Ability to switch between normal, non-normal and half-normal positions on each channel. For a full description of this, see [Patch Bays – A Beginners Guide | Hosa \(hosatech.com\)](#).

The unit fits a standard 19-inch rack. User manual included. Asking \$50

Contact: John VE7TI ve7ti@rac.ca



RARC Swap Meet on July 23

Richmond Amateur Radio Club (RARC) announces its swap meet to take place on Saturday, July 23rd from 9:30 AM to 12 noon at the South Arm United Church - same location as previous RARC swap meets at SW corner of Steveston Highway and No. 3 Road in south Richmond.

Admission remains at \$5 per person and vendor tables are \$20 each. The usual door prizes, giveaways and raffles will be announced once they are confirmed. Additional info and ongoing planning updates will be posted at: <http://www.richmondarc.ca/swapmeet2022.html>.

SURREY AMATEUR RADIO COMMUNICATIONS

Radio-Active

Profiles Of SARC Members

While at the Maple Ridge ARC swap meet in April, Gord Kirk and I encountered Dino VE7XDT/VE7NX, whom we both knew from earlier days. It was a fortunate meeting because we recalled that Dino is a ham with considerable experience and talent. Our interests aligned, which has recently led to him joining SARC.

Since then he has proposed several suggestions for club construction projects. A follow-up article in this Communicator describes a low cost GPS/clock project that will appeal to many. He also participated in the CQ WPX CW contest in late May as part of the VE7SAR team after a contesting hiatus of 8 years. It seemed obvious that Dino should be the next candidate for our July-August member profile.

Many local hams will remember Dino by the “Dino SWR/Power meter” [shown below] that he

designed and offered in kit form to local hams about 15 years ago. This meter offers 3% accuracy, better than anything available in the marketplace. I also recall that on the 50th anniversary of the first Russian satellite Sputnik-1 (launched on Oct 4, 1957) Dino gave a talk about it to SARC and during our club meeting we listened to the satellite AO-51, broadcasting the original Sputnik signal and a voice announcement in Russian and English.

Dimtcho Gueorguiev (“Dino”) was born in Bulgaria, the son of a policeman father and factory worker mother. Bulgaria was, of course, under Communist rule at this time and conditions were very difficult, although medical care as well as a good education were free if you were a good student. Dino says there was little crime, as the punishments were severe. Virtually no unemployment existed, but also there was little incentive to achieve a better life under the oppressive regime. At age 29, he left Bulgaria after the breakup of the Soviet Union when his daughter was only 3 years old. His departure for London, England was made possible by a Scottish tourist couple who took a liking to him while he was engaged part-time as a taxi driver, and helped him leave the country.



*Dimtcho (Dino)
Gueorguiev VE7NX/
VE7XDT/ LZ2DT*



SURREY AMATEUR RADIO COMMUNICATIONS



Bulgaria today

Bulgaria joined the European Union in 2007 and is also a member of NATO. The country is in a strategic location bordering on the Black Sea, sandwiched between Greece, Ukraine, Romania, Turkey, Moldova, Serbia and Macedonia with countries of the Russian federation not far away. Bulgaria, as one of several EU countries whose natural gas supplies were cut off recently in connection with the Ukraine war, is feeling the heat of that conflict.

Following 2 years of compulsory military service starting at the age of 18, Dino received his advanced education at the Technical University of Varna, where he achieved an MSc in Mechanical Engineering, specializing in marine engineering. His first job entailed technical maintenance of Russian submarines and diesel engines for ships in a military shipyard. His talents were soon recognized by a local hospital which lured him away to repair biomedical equipment.

Dino got into ham radio at the age of 16 with the local club LZ2KEF. After finishing the University he was the President of the local ham radio club LZ2KKK. The procedure to obtain an amateur license in Bulgaria was onerous compared to that of western countries: the applicant was required complete a 3-month course on technical subjects and radio skills including CW; then under supervision he was required to make and obtain QSL confirmation of 50 QSOs using the club callsign, then after another 3-month advanced course, obtain 200 confirmed QSOs, and finally write the exam. If successful, the applicant could apply for a license which would require him to build his own radio station within 6 months and subject it to inspection and approval by a licensed ham. Only then would a callsign be awarded.



Above: Dino operating Field Day on AO-40 satellite in 2002

Bottom: Dino's impressive VHF antenna array at his former QTH in 2001



Dino's test equipment at his former residence



Dino's HF station at his former QTH

SURREY AMATEUR RADIO COMMUNICATIONS

All this despite the scarcity of radios and parts which were almost impossible to obtain. However, while employed in government service, Dino was able to get “unofficial” help from other hams and government personnel who had access to things not available to the average citizen. His first project at the age of 14 was a 3-tube audio amplifier built with scrounged components, which included winding his own transformers. Dino was awarded his callsign of LZ2DT after the build of a transceiver in 1988. The PA was 50 W using GU-50 Russian tube; the remainder was transistor based Russian projects.

Dino has a brother still in Bulgaria. His daughter is a Registered Nurse and works as a Pediatrics Nurse in the Emergency Department at Surrey Memorial Hospital. Dino has one grandson and another grandchild on the way.

Dino spent the time between 1990 - 1995 working in London, UK. He went to the Radio Society of Great Britain and met some Ham friends with whom he keeps in touch to this day. In 1995 he immigrated to Toronto, Canada and in 1996 he was transferred to Vancouver.

VE7XDT/VE7NX, Dino is a ham of varied interests. His current favorite activity is building ham gear and test equipment, some of which is shown in the images. His goal is always to build from boards and chips as cheaply as possible rather than constructing kits or purchasing assembled units. Most of all he enjoys helping others build and seeing the satisfaction of those that have never done it before. Other interests which he has pursued over the years are Arduino, DXing and HF contesting, satellites, 10 GHz microwave, QRP and 2m EME (moon bounce).

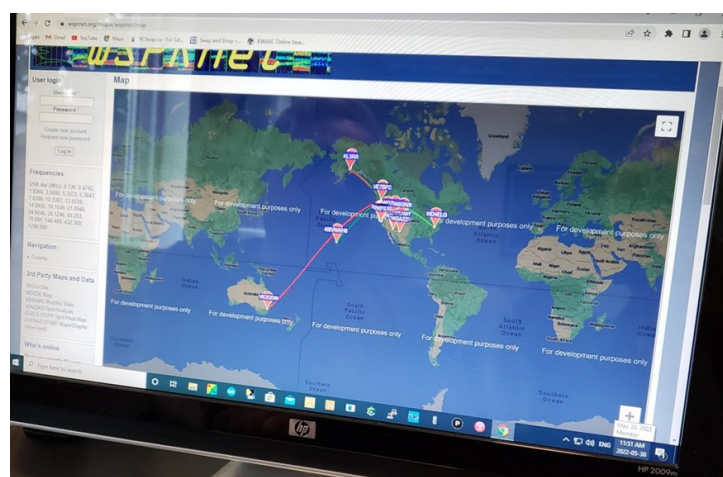
We welcome Dino into SARC knowing that he is a ham of many talents and ample enthusiasm who will make a big contribution to our society.

~ John VA7XB



Equipment home-made by Dino (some from QRP Labs)

One of Dino's many home-built projects, this one a 100 w auto tuner



WSPR reports from Dino's home-built WSPR transmitter running 1 watt into a multiband antenna only 2 m off the ground!



SURREY AMATEUR RADIO COMMUNICATIONS



John Brodie VA7XB



Another Successful Contest Under our Belts

Hey, we're getting better at this and building some depth to our CW team, which is growing. SARC made a credible showing in the WPX CW contest on May 28-29 by making 1413 contacts in total by the 5 operators - Slawa VE7LWW, Dino VE7NX, Jan VA7VJ, Kevin VE7ZD and John VA7XB. VE7SAR had a presence at all times, except late Saturday night.

Except for Field Day, I believe we have never made more than 1300 contacts in any previous event, regardless of mode, so well done team. Dino had not done CW contesting for many years, and this was only Kevin's second contest after many years away from it. Thanks to everyone, especially those who put in long hours (Jan and Slawa) and those who had to get up to speed quickly after a long layoff (Dino and Kevin). And thanks to John (that's me) for organizing.

Two problems arose: 1) the rotator refused to respond at first.

After trying various things, it only came to life with a fist thump on the controller (!) - we need to diagnose

and fix this if it continues; 2) the PC locked up at one point when Function and Enter keys would not respond but a reboot and some ferrites on the keyboard lead seemed to remedy the problem.

Conditions were quite variable but better Saturday compared with Sunday when activity seemed to die out mid day. It was frustrating to see all the East Coast spots with EU stations we couldn't even hear. And JA's were unusually thin on the ground for this international contest.

83 countries worked. Our most distant contacts were Sudan, Israel and Singapore. An early morning opening to the west on Sunday provided Qs with Indonesia, Malaysia, Vietnam and Thailand. Although Russian stations were virtually absent due to the WPX boycott, we did make Kyrgyzstan, Kazakhstan and Ukraine.

The statistics are on the next page.

~ John VA7XB



SURREY AMATEUR RADIO COMMUNICATIONS

Following are results for North America participants reporting in our category of Multi-One.

Contest Online ScoreBoard							30 May 2022 16:01 UTC CQ WPX CW (28 May 00z - 30 May 00z)		SFI:98 Kp:1
Closed: CQ WPX CW		Go	Highest rate: 443 q/h by M3AWD			Powered by ICOM	2022		
Home	Profile	Filter	View	Clear Filter	Breakdown	Clubs	Teams	Manual post	Archive Supported contests Help with logger set up Blog
M/S HP		Score	QSO	Prefixes	Last				Log
1	ZF1A	16,257,550	4,610	1,150	15:49				DX
2	WK9M	5,758,382	2,479	938	16:00		Tennessee Contest Group		N+
3	NY6DX	4,503,299	1,944	887	15:48		Frankford Radio Club		N+
4	KU7T	3,585,330	2,023	813	15:51		Bavarian Contest Club		N+
5	ND3D	3,293,622	1,575	753	15:48		Potomac Valley Radio Club		N+
6	KJ5Y	2,472,810	1,611	695	15:50		Texas DX Society		N+
7	VE7SAR	2,368,888	1,412	604	16:03		Surrey Amateur Radio Communications		N+
8	NC1CC	715,340	662	470	15:48		Yankee Clipper Contest Club		N+
9	NW6P	46,500	178	125	15:48		West Valley Amateur Radio Association		N+
10	N1TA	13,348	75	71	15:48		Yankee Clipper Contest Club		N+
11	W1WBB	300	10	10	16:13		CT RI Contest Group		N+

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Dino VE7NX looking smug with his first contact (Italy) of his shift after a contest layoff of 8 years and little CW practice in between.

Below: All continents worked except Antarctica.



1 3D2F Fiji	1 26 ER Moldova	2 51 OH Finland	8 76 W USA	898
2 3W Vietnam	1 27 ES Estonia	2 52 OK Czech Rep.	9 77 XE Mexico	4
3 4U1U UN New York	1 28 EX Kyrgyzstan	1 53 OM Slovakia	5 78 YB Indonesia	6
4 4X Israel	1 29 F France	7 54 ON Belgium	1 79 YL Latvia	3
5 5B Cyprus	1 30 G England	5 55 OZ Denmark	4 80 YU Serbia	5
6 9A Croatia	6 31 GI Northern Ireland	1 56 P4 Aruba	4 81 ZF Cayman Is	7
7 9M2 West Malaysia	1 32 HA Hungary	11 57 PA Netherlands	2 82 ZL New Zealand	8
8 9M6 East Malaysia	3 33 HH Haiti	1 58 RJ2 Curacao	2 83 ZP Paraguay	2
9 9V Singapore	1 34 HI Dominican Republic	1 59 RJ4 Bonaire	1	
10 BV Taiwan	1 35 HK Colombia	1 60 PY Brazil	44	
11 BY China	10 36 HL South Korea	2 61 S5 Slovenia	4	
12 CE Chile	10 37 HP Panama	1 62 SM Sweden	7	
13 CN Morocco	1 38 HS Thailand	2 63 SP Poland	14	
14 CO Cuba	3 39 I Italy	8 64 ST Sudan	1	
15 CT Portugal	2 40 JA Japan	98 65 SV Greece	2	
16 CT3 Madeira	4 41 KH6 Hawaii	20 66 TG Guatemala	1	
17 CX Uruguay	5 42 KL7 Alaska	6 67 TI Costa Rica	3	
18 CY0 Sable Island	1 43 KP2 Virgin Islands	4 68 UA Russia EU	3	
19 D4 Cape Verde	2 44 KP4 Puerto Rico	9 69 UN Kazakhstan	4	
20 DL Deutschland	21 45 LA Norway	1 70 UR Ukraine	1	
21 DU Philippines	1 46 LU Argentina	21 71 V3 Belize	1	
22 E7 Bosnia and Herzegovina	1 47 LY Lithuania	8 72 V4 Saint Kitts and Nevis	1	
23 EA Spain	6 48 LZ Bulgaria	1 73 VE Canada	54	
24 EA6 Balears	1 49 OA Peru	5 74 VK Australia	13	
25 EA8 Canary Islands	3 50 OE Austria	6 75 VP9 Bermuda	1	

Operator	3.5	7	14	21	28	Tot
VA7VJ	5	22	254	54	0	335
VA7XB	0	0	72	33	0	105
VE7LWW	37	284	291	141	21	774
VE7NX	0	0	41	18	1	60
VE7ZD	0	0	90	45	4	139
Total	42	306	748	291	26	1413



If its June... it must be Field Day!

SARC and SEPAR put on an extraordinary event

June 25-26

Jason Biggin VA7ITJ

Field Day has just past, and I am taking a moment here to reflect on our event. For some, this was another one ‘in the books’ as they have extensive experience. For others it was their first time of hopefully may amateur radio activities. Either way, Field Day is a wonderful event to join the community together, showcase our abilities, test out our equipment, contest, and have fun.

Although we did not setup ‘in the field’, there was still significant efforts and testing of equipment. The Bigfoot trailer was deployed which provided 30+ Meters elevation for the 10-15-20 bands. As this is a large and heavy item, great care was exercised with the placement.

From this exercise, we reviewed some opportunities to improve, and discovered some new challenges. In particular, the inability to lower the tower with its own power. Fortunately, the crew was able to establish a workaround with hydro power to meet the immediate need, allowing for a more involved repair for after the event. We also deployed the SEPAR trailer, solar panels, relocated one HF station, and relocated the 40-80 M wire antenna. With this number of changes, it could be said that we ‘brought the field to the OTC’.

On Saturday, there was a flurry of activities which made for a full day. Notable events included Kevin VE7ZD receiving EME signals, Reg VA7ZEB demonstrating APRS, John VE7TI making satellite contacts and posting to social media outlets, Jeremy VE7TMY switching stations to solar and emergency power. Inside the OTC, HF operators were busy exercising their skills to make QSOs, and inside the SEPAR trailer early enthusiasts were picking up the skills. We also chatted with the visiting public, elected officials: Brenda Locke & Linda Annis (City of Surrey), and agency representatives: Shelly Morris (Surrey Fire) & Steve Kern VA7RSM (Saint John’s Ambulance). It was also great to see Kjeld VE7GP, Pam VE7PFF & Don VA7GL, and Robert VA7FMR. Fortunately, we were able to re-fuel with a potluck supper and BBQ hosted by Ralph VA7UB and Nell VA7PE. Afterward,





Steve VE7SXM thanked Jinty VA7JMR for all the help she has provided with running the SARC net, organizing Christmas parties, and for being a treasure to the SARC community.

I wish to thank the planning committee for their help with this event. This crew determined what we would do this year and took the steps to make it possible. Some of these activities included obtaining permission from the City to deploy Bigfoot and getting the placement of blocks for the guy lines (Thanks Gord VA7GK). Also, promoting the event with a media release and the declaration of “Amateur Radio Week” by the City of Surrey (Thanks John VE7TI and Gord VA7GK). Also thanks to John VE7TI, we were also promoted with an article in the Surrey Now/Leader, authored by a recent Basic course student, Beau Simpson.

We had a great complement of Elmers: John VA7XB, Stan VA7NF, Gord VA7GK, Steve VE7SXM, and John VE7TI. Each were very supportive with coaching the newer enthusiasts: Adrian VA7YEP, Andrew VA7LGN, Manvir VA7BKI, Thomas VE7TXL, Bill VA7PFP, and myself VA7ITJ. Although it was not always easy to fit into



SURREY AMATEUR RADIO COMMUNICATIONS



Field Day activities included EME, Satellites, CW and phone. Above Reg VA7ZEB demonstrates APRS

SURREY AMATEUR RADIO COMMUNICATIONS

everyone's schedule, the conversations we had, and sharing of knowledge were very meaningful. In particular, John VA7XB, was always available and thoughtful to make this a great occasion.

Lastly, I am compiling our items to submit to ARRL this week. From the N1MM+ log I can see we made 812 QSO, not including the 27 GOTA contacts. These will be complemented with the bonus points earned. Results will be posted in the December edition of QST, and at <http://www.arrl.org>.

~ Jason VA7ITJ



SURREY AMATEUR RADIO COMMUNICATIONS

Your SARC Membership



If you have not already renewed, your membership in SARC expires on May 31st.

You are requested to renew your membership prior to the next AGM, which is tentatively scheduled for June 15th.

Note that only those whose membership is in good standing may vote or be eligible to run for a Director's position.

Payment may be made in one of several ways:

1. Use PayPal on the SARC website:
www.ve7sar.net
2. If we meet, bring a cheque or cash to the AGM
3. Mail a cheque to our Treasurer Scott Hawrelak
13935 80A Avenue, Surrey V3W 6P5

Dues are as follows:

- Individual \$31
- Individual (if RAC member) \$26
- Family \$41
- Family (if RAC member) \$36

Thankyou for taking care of this as soon as possible.

~ John Brodie VA7XB
Membership

A note from Jinty

With regret and with a struggle during the decision making process, I have decided to leave SARC. My reasons are that I get very tired these days and recognizing I am getting a little old in the tooth I have to cut back on my activities. Which of the many ones I am involved in becomes the quandary?

When considering ham radio I thought of the many years I have enjoyed interacting with you all and what a great bunch of people I have been privileged to know and work with. I also have to admit that I am not a technical person so much of ham radio goes over my head. This has been a challenge for me. With all of this in mind, I will officially be ending my time with SARC on June 14th when I do net control for the last time, my 'swan song', if you will ha ha!

May I take this opportunity to wish you all the very best in your adventures and projects. Take care, stay healthy and bless you all.

~ Jinty Reid VA7JMR



Jinty was our 'Amateur of the Year' in 2013. She has been active in both SARC and SEPAR, a regular Net controller and Christmas Party organizer. Jinty... we'll miss ya!

General Meeting Minutes



May 11, 2022
SARC General Meeting

Attendees: 27

Start Time: 7:03pm

Location: Online Zoom Meeting

Welcome and Call to Order - (John Brodie VA7XB)

AGENDA

- Scheduled Presentation (7:00pm-8:00pm)
Field Day (Jason Biggin - VA7ITJ)
- Business meeting (8:00pm-9:00pm)

Announcements

- SARC Annual General Meeting - 7PM, Tuesday, June 14, 2022 at the Surrey Fire Services Training Centre, 14901 64th Avenue, Surrey;
- Memberships must be renewed if you wish to vote, proxy forms will be available before the meeting;
- New Westminster Hyack International Parade, Saturday May 28, 2022 Looking for Radio Operator;
- Saturday Breakfast and OTC Open House Saturday mornings 7:30am - 9:30am : Denny's at 68th and KG Boulevard. Passports no longer required at the OTC - 5756-142nd Street. Open from 10am to 12pm Saturdays - Come check it out;

- Basic Exams can be written at the OTC on Saturdays, 10am to 12pm;
- SARC in-person meetings may resume in September.

Reports

FINANCIAL (SCOTT)

- Scott reported on current balances and our major purchase of an iCom 9700 and Quick Books program plus OTC maintenance;
- Name badges are \$10 and would be available in the fall. Scott is collecting names right now please email him if interested.

Committee Reports

FOX HUNT REPORT (JEREMY/ANTON)

- Jeremy - SARC held their annual Fox hunt last weekend on Saturday May 7/2022. Anton was sick a few days leading up to the event and unfortunately we had to cancel the BBQ portion of the event. The weather cooperated with us despite most of the week being heavy rain. We had a single start for everyone and no separate categories this year for novice/experts. We had 13 names signed up for the hunt but probably more than 30 actual participants grouped together or just visited us at the park. First Place Peter and Paula 43:47; 2nd Les Tocko 49:37; 3rd Henry 50:59. A big thanks to those who volunteered to help make this event

SURREY AMATEUR RADIO COMMUNICATIONS

possible:

Anton for organising the event,
Ralph and Nell provided drinks and snacks,
Jeremy and Thomas for hiding the foxes,
John Brodie and Steve for helping with the training and time logging,
Les and other engineers on the transmitters and receivers.

- Les - Has donated six 2m 1watt transmitters to SARC/SEPAR. Propose group build offset attenuators and yagi antennas for 2m fox hunting. Will send info to John B to discuss at director level and determine how many people are interested in building the kit.

SEPAR - (GORD - VA7GK)

- John S and Ron Casey have visited the RCMP district offices and checked out the radios, replacing antennas as needed;
- The computer for Firehall 1 is with Thomas Ball and it is being upgraded;
- Successful check in test with the inter-municipal net;
- Public display at Surrey Sport and Leisure (about 14 members visited);
- Helped promote a new app the city called 'Alertable' that anyone can use to receive alerts in their area.

OTC - (GORD - VA7GK)

- OTC broken railing has already been fixed;
- SFSAR had a group participating in the Emergency Alert;
- SFSAR Mon/Thur is their training nights and we're still working out a shared calendar;
- Saturday AM we have a list of tasks presented at the last meeting. Power and testing with the generators and also coax and prep for Field Day.

MEMBERSHIP - (JOHN - VA7XB)

- 115 members currently;

CONTESTS - (JOHN - VA7XB)

- If you plan to operate on Field Day you should operate a contest between now and then.
- May 14-15th CQ-M DX Contest CW/Phone & Canadian Prairies QSO Party
- May 28/29th - CQ WW WPX Contest
- June 24-25th - ARRL Field Day 2022
- July 1 - RAC Canada Day Contest
- - Every weekend there are contests happening.

[https://
www.contestcalendar.com/
weeklycont.php](https://www.contestcalendar.com/weeklycont.php)

- Collecting names for the contest distribution list.

Send your name, callsign, mode of operation and if you're a beginner or experienced contesteer to brodiejb@shaw.ca.

- May 15-July 15th Queens Jubilee (Andrew Elgin - <https://www.rac.ca/special-call-signs-available-in-honour-of-the-queens-platinum-jubilee/>).

NETS - (JOHN - VA7XB)

- We have a full set of net control operators but are looking for a new net operator to take over 1 week.

COMMUNICATOR - (JOHN - VE7TI)

- The Communicator continues to be well-received and distribution is ever increasing.

HAM CLASS (AND EXAMS) - (JOHN - VE7TI)

- Started March class exams yesterday with 6 writing, and all passed. Marks have been very high with most scores in the 90s. Most have received honours. We will be writing exams for the next 2-3 Saturdays before starting the next class on June 13th.

CW COURSE (KEVIN - VE7ZD)

- John VA7XB reports that the class is on Thursdays at the Fire training centre at 7pm. About 20 are signed up so far.

SURREY AMATEUR RADIO COMMUNICATIONS

- John S stated that he and Kevin are working on an inexpensive but good, sine-wave code practice oscillator as a student build project.

APRS (REG - VA7ZEB)

- We have permission to set up at Concord tower and Linux has been installed on an old PC. This PC needs to be secured to the location (for earthquake preparedness). A big thanks to Dave Cameron who has been helping every step of the way here.

Old Business

REPEATER UPDATE (GORD)

- Steve/Gord installed it at the south site and received some interference when they turned it on similar to the intermod at the north site. Dave Cameron has been notified of this for input. The south repeater is now a commercial grade repeater (135 watts possible) but end of its commercial service life and it's been repurposed for our use.
- Flex 6600 with Maestro Operation Training - Stan has offered to run "drop-in" training sessions at the OTC on the Flex 6600 - Saturday mornings 10am - 12pm, open agenda
- We would like to get more members using this radio

Projects in the works

- iCom 9700 Radio to be purchased - PURCHASED;
- Bigfoot tower generator upgrades - In progress;
- APRS/Winlink at the OTC - In progress
- OTC Internet - still struggling to get good Internet;
- Additional grounding for the grey tower - In progress;
- VHF/UHF Yagi install on the grey tower;
- DC power infrastructure in the OTC - In progress;
- Generator testing - Waiting for good weather;
- Roof & drain Cleaning - On going.

New and other business

- 2022 AGM - June 14th, 2022
- New Westminster Hyack International Parade

CALL FOR OTHER NEW BUSINESS

- John Hummel-Newell VE7JHN reports RAC has a presentation scheduled for

CanWarn weather: <https://www.rac.ca/canwarn/>

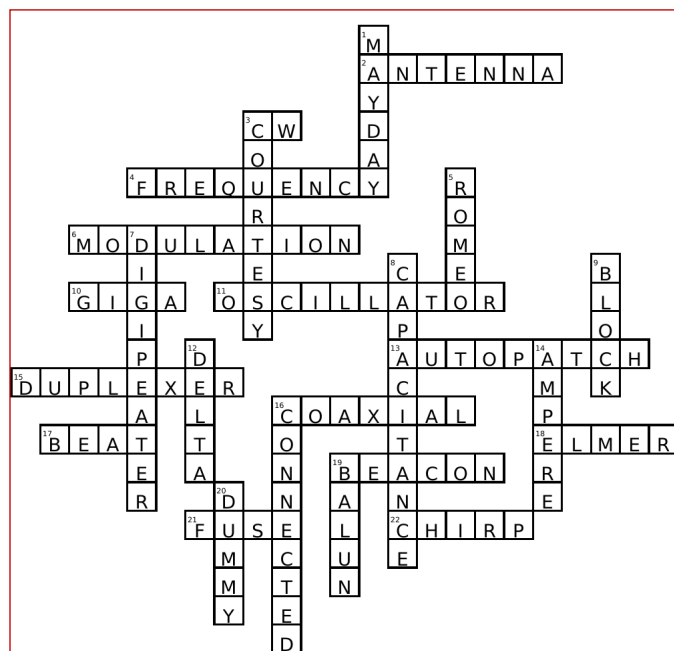
- Introductions from new members
- John Hancorn VA7YGD interested in Emergency Prep
- Dino VE7XDT/VE7NX Dino SWR in grab and go boxes

Adjournment of the Business Meeting

- Andrew Elgin moved to adjourn the meeting. Bill Teskey seconded. Carried
- Meeting adjourned at 8:58pm

~ Minutes prepared by Jeremy Morse VE7TMY

Crossword solution from page 69



General Meeting Minutes



June 14, 2022
Annual General Meeting

Attendees: 34

Start Time: 7:07pm

Location: Surrey Fire Training Centre

THE ANNUAL GENERAL MEETING OF THE SARC SOCIETY WAS CALLED TO ORDER BY STEVE VE7SXM AT 1905.

Welcome

The Annual General Meeting of the Surrey Amateur Radio Communications Society for 2021-2022 was called to order at 7:08 pm on June 14/2022 by President Steve McLean VE7SXM.

Steve welcomed everyone to the meeting and explained that the Annual General Meeting will be followed by short break and a General Business Meeting.

Confirmation of Quorum

As of today we have 120 members and we require a total of 30 attendees for a quorum. We have 34 members in good standing present tonight so a quorum has been reached.

Approval of Agenda

The agenda for the evening was presented on the screen. Rob G moved the agenda to be accepted. Seconded by John S. Carried.

Approval of the Minutes from The 2021 AGM

- Jeremy Morse VE7TMY prepared the minutes from the last AGM which were distributed in the SARC Communicator and available tonight if needed.
- With no questions on last year's AGM minutes, they were accepted.

Presentation & Approval of 2020/2022 Financial Statements

- Steve: We are moving from a flat file/ excel style of bookkeeping to the use of Quickbooks.
- Scott H: SARC Balance Sheet 2021/2022 and Income/Expense were presented on screen.
- Kevin McQuiggin moved to accept the financial statements as presented. Seconded by Marvin Hunt. Carried.

Committee Reports

SEPAR - (GORD - VA7GK)

- Computer at Fire Hall 1 is being rebuilt
- VE7MOV Winlink has been rebuilt and is operational but it may be moved to a higher site.
- APRS project has been started

- SEPAR trailer has been repaired/rewired after some vandalism in recent years.
- SEPAR Society is being collapsed and assets will be transferred to SARC. The SEPAR (as distinct from the Society) remains active.
- The OTC has been provided for use as part of the Emergency Program

OTC - (GORD - VA7GK)

- In the last year the OTC was moved from the previous location to a shared space with SFSAR (South Fraser Search and Rescue)
- Common area is available to SEPAR/SARC and SFSAR.
- Access to the building is available 24/7
- Radio room has been set up with 3 stations and new computers.
- We have been authorized to set up bigfoot tower temporarily
- The grey tower has been set up including a beam antenna, wire and other antennas on the site.

- Hot water and air conditioning systems were serviced.

MEMBERSHIP - (JOHN - VA7XB)

- Total of 120 members now of which 84 are in good standing with 36 yet unpaid.
- In addition, we have several hundred non-voting members from the ham classes.

CONTESTS - (JOHN - VA7XB)

- Over the last fiscal year (12 months) not including Field Day members have participated in 10 contests as a group including the BC QSO party, Canada Day, RAC Winter contest, ARRL DX, CQ WPX, CQ WW on SSB, digital and CW. About a dozen members are active in the contest group, which is improving our skills and the station functionality.
- We have trained some new operators and are introducing them to the world of contesting.

NETS - (JOHN - VA7XB)

- We have a full list of net operators but are always

looking for backup operators.

- Contact John B if you'd like to help out.

COMMUNICATOR - (JOHN - VE7TI)

- The Communicator is read in 147 different countries now and we continue to reach a new country in almost every issue.
- SARC Blog Site shows approx. 5000 downloads per issue plus an unknown number forwarded.
- A thank you to John B and Kevin M as editors/ contributors and all the authors.

HAM CLASS (AND EXAMS) - (JOHN - VE7TI)

- We've moved to online classes during the pandemic using a platform called Canvas with 3 classes the first year and 4 per year now in Jan/Mar/June/Sept.
- Thanks to instructors Stan and Kevin, and administrator John B.
- 2020 77 students average with average score in the 80s



SARC 2022-2023 Directors



SURREY AMATEUR RADIO COMMUNICATIONS

- 2021 196 students 4 classes with average scores in high 80s
- 2022 145 students 3 classes so far with average scores in the low 90s

CW CLASS (KEVIN – VE7ZD)

- We have about 20 students now in week 5 and the class is going very well.
- Exams are being planned in a couple weeks.
- Will look at offering another CW class regularly

REPEATER UPDATE/STATUS - (STEVE – VE7SXM / GORD – VA7GK)

Steve:

- We have north site and south sites with the latter having some issues in recent years. Both are on the same frequency using a different tone but now working well.
- The Yaesu repeater was removed from the South site and is being reconfigured by Horace for WiresX to eventually replace the UHF at the north site.

Gord:

- 220 repeater has been very active lately but is being looked at for possible overheating. Reg: After the Tues VHF net there is an informal 220 net and interest is growing.
- Remote receive between north site and UBC is being tested.

Special Thanks to Jinty Reid - VA7JMR

John S: Jinty Reid VA7JMR is withdrawing from her amateur radio activities and tonight will be her farewell as net controller on the SARC net. We will try and break the meeting in time to make a check in and thank her for many years of service to SARC.

Accomplishments for the year (Steve VE7SXM)

- Grey tower setup
- Radio room setup
- Grounding project
- Water leak resolved by roof and drain cleaning
- Meeting at the Denny's on 68th/King George every Saturday followed by the OTC afterwards.
- Helping members tune/ service their radios and antennas in the parking lot
- Swap meet/parking lot sale
- Contesting
- Social meet at OTC
- Community presentation by SEPAR group
- Ham Class 196 last year and 145 this year so far.
- Big thanks to all the volunteers and Stan, John S, Kevin, John B.

Election of Directors (Gord VA7GK)

- We have 8 directors in our society and half are elected each year for a 2 year term.
- Scott, Gord, Steve, Kevin have 1 more year in their term with the remaining 4 directors willing to stand again for another term. Positions of President, Vice President, Secretary, Treasurer will be decided at the next director's meeting.
- We will take nominations from the floor as long as the person is in good standing and willing to accept the nomination. We have 4 director positions open for election tonight. Call for nominations from the floor followed by second and third call.
- With no nominations received from the floor, John Brodie, Jeremy Morse, John Schouten and Stan Williams were elected by acclamation.
- Steve - This concludes our AGM. Gord moved that we adjourn the AGM at 7:50 pm, seconded by Bill T. Carried.

Meeting adjourned at 7:50pm

~ Minutes prepared by
Jeremy Morse VE7TMY, and
edited for The
Communicator by John
VA7XB

General Meeting Minutes



June 14, 2022
General Meeting

Attendees: 34

Start Time: 8:09pm

Location: Surrey Fire Training Centre

The monthly General Meeting was called to order by Steve VE7SXM.

Welcome

New Business

Kevin McQuiggin has 3 phones suitable for ham shack hotline. Cisco 504G first come first served

PROJECTS AND KITS – (JOHN B. – VA7XB)

- All projects will require some commitment of funds so if you are interested in any of the projects presented tonight please look for an email signup. If you are able to pre-pay via paypal do include in the note what project it is for and consider adding 3% for paypal fees.

Les VA7OM Projects - 2m attenuator and tape measure beam (with pics)

- Preliminary cost estimate is \$20
- Could have a build group at the OTC

Dino VE7XDT project - GPS/ Clock

- Estimated \$50-\$65 depending on the price of the GPS receiver.

Code Practice Oscillator (John S VE7TI & Kevin McQ VE7ZD)

- Have ordered 12 for the current CW students.
- Based on interest we will order more parts for others to build
- Cost will be less than \$25

CONTESTS – (JOHN B. – VA7XB)

- WPX CW in May with 5 participants - 1413 contacts and 83 countries worked including Sudan and Israel.
- RAC Canada Day Contest is coming up. VA7RAC Contest

callsign will be available to us this year. Distributed Multi-Op (stations in different locations coordinated with Internet) may be considered. Stan - DMO needs to be set up early.

- Contesters list has been created. If you'd like to be on the list contact John B.

FIELD DAY DISCUSSION – (JASON – VA7ITJ)

- We will be operating at the OTC this year. It's a good opportunity to exercise our equipment and our skills. It is a contest, emergency operation and open house/ social event. We will be operating as a 2F classification. One station will be moved to the training area to provide some distance between the two. We will have a 3rd station (GOTA) set up in the SEPAR trailer. We are aiming to acquire some extra points where possible with bonus points available for:

SURREY AMATEUR RADIO COMMUNICATIONS

- Alternate power
 - Educational session
 - Emergency Power
 - Youth participation
 - GOTA Station
 - Media publicity and release for Amateur Radio Week
 - Message handling, safety officer
 - Elected Officials
- Announcements**
- Next general meeting is Sept 14th. Not sure if it will be online or in person yet.
 - Saturday we still have a regular social get together for breakfast at Denny's King George Blvd & 68th Ave.
- OTC visit after breakfast and most of the time we have it to ourselves and generally wind up around noon.
 - Tuesday night nets will announce social meetings for July and Aug at OTC; stay tuned.
 - Looking for someone to take over the planning of Christmas party duties from Jinty
 - Gary VE7GPR, a local pilot in the Club, is participating this Saturday in an emergency response test of the local aviation community. BC and WA (DART) Disaster A? Response Team) BC Arrow. Setting up at Langley Airport VHF UHF to repeater on Mt Vernon. N7CRA? A few Canadian operators have been involved so far. Abbotsford, Langley and

Bellingham. 30000 lbs of food will be transported around. Winlink will be used. Sat 7am June 18th. West coast flying club on the southeast portion of the field. An email will be sent with further details. VE7OK VE7GPR VE7QH Chilliwack?

Adjournment of the Business Meeting

- Moved to adjourn the meeting by Andrew seconded by Bill. Carried.

Meeting adjourned at 9:08pm

~ Minutes prepared by Jeremy Morse VE7TMY

Reprint Policies

These are policies for reprints from The Communicator, a bi-monthly journal about amateur radio and other topics published by Surrey Amateur Radio Communications (SARC).

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We welcome your comments and feedback

Please consider leaving a comment via email to communicator@ve7sar.net, or on our blog site <https://ve7sar.blogspot.ca> or, better yet, contact our authors directly, so they know someone is out there reading our publication.

SURREY EMERGENCY PROGRAM AMATEUR RADIO



SEPAR Report

*The year to date...
it only gets better*

Gord Kirk VA7GK
SEPAR Coordinator



Reflecting over the last couple of years as the SEPAR Coordinator we have done a lot of work. In spite of the COVID-19 pandemic, we have with the help of the membership, seen many changes and improvements in the SEPAR program.

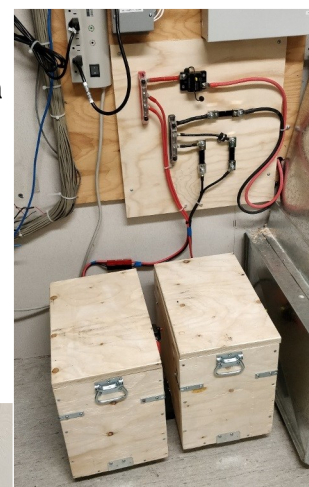
During the last couple of years a number of things have changed and some of them have had a positive impact to our program. With the acceptance and use of virtual meeting programs like ZOOM we have been able to carry on and increase participation at our monthly meetings. As part of the "Emergency Program" we were still permitted to access and meet as per our safety plan to carry out essential work but did use ZOOM whenever possible to limit risk to our membership.

During this time we have serviced and maintained equipment. This includes the small generator maintenance, radios located at all of the Community Police Stations had new roll up J-Pole

antenna's built and placed with them, and the maintenance of the repeaters we use, which includes the upgrade to a new Motorola repeater from the old GE Master II unit.

We have a project being worked on to improve the Automatic Packet Reporting System (APRS) coverage in the city. With the ability to track radio operators, send text to cell phones and Winlink email via APRS, we want to improve the use and the coverage of APRS in our area.

SEPAR has also held a weekly Winlink Digital Net, encouraging check-ins via Winlink so users are ready to use the tool when needed. The RSM station for this also has a new (to us) computer running the RMS software. We hope in the near future to move this to a new location to help provide better coverage.



*New power
management at the
OTC, which is now fully
on battery backup*

SURREY EMERGENCY PROGRAM AMATEUR RADIO

Our weekly nets are every Tuesday night on the SARC repeater on 147.360 + T110.9 at 07:30 pm PST. All are welcome to check in.

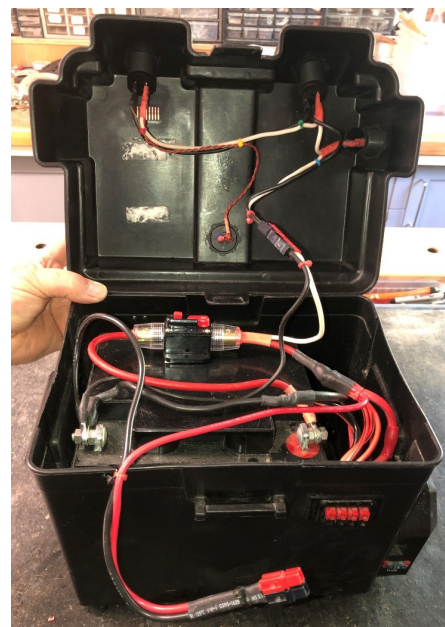


The biggest change has been in our Operations and Training Center (the OTC). This location has a fully functional contest grade radio station in operation. There has been tremendous support from Surrey Amateur Radio Communications (SARC) the group which supports the Emergency Program Volunteers.

The OTC provides a place to operate and train as well as a place to work on projects and if necessary help fix problems with the local amateur operators' radios, antennas etc. The Saturday morning drop in time has been very successful in getting an active group ready to support SEPAR when needed.



It has been a productive year at SEPAR and our Operations & Training Centre. There is a Saturday morning drop-in where our Elmers can assist with a variety of common issues. The three stations, now with a new iCom 9700 are fully operational.



Surrey Emergency Program Amateur Radio

SURREY EMERGENCY PROGRAM AMATEUR RADIO



*SEPAR volunteers
Andrew, Adrian, Bill
and manvir at the
Hyack Parade*



With the lifting of restrictions on public gatherings a local parade/festival was recently held and supported by many members of SEPAR.

Just prior to the event we held training on “working at events as a radio volunteer” and went over what to expect, what is normally expected from the volunteers, and how to prepare. Not only was this well attended but the volunteers at the event were successful in locating missing children who became separated from their parents.

Overall we have had a very busy year, leading up to a very successful Field Day.

I encourage everyone to be active in your local Amateur community, know how the volunteer emergency program works and see how you can help out. It is a very rewarding experience.

~ Gord VA7GK

Name	Frequency	Offset	CTCSS
VE7RSC (Primary Repeater)	147.360	+0.600	110.9
VE7RSC (Secondary Repeater)	443.775	+5.0	110.9
VE7RPT (Primary Regional Repeater)	146.940	-0.600	
Optional 136.5 Rcv			
Simplex 1	(VHF)	146.550	
Simplex 2	(VHF)	147.420	
Simplex 3	(UHF)	446.550	
Simplex 4	(UHF)	447.425	

Other frequencies in the Greater Vancouver area:

Primary: Coquitlam/Abbotsford	146.430
Primary: Inter-Municipal Group 3	146.445
Primary: Vancouver; Mission; Sec. Coquitlam	146.460
Primary: Kent-Mission; Sec. Richmond	146.475
Primary: Inter-Municipal Group 2	146.490
Primary: New West; Sec. Richmond	146.505
National Calling / FM Simplex Group I	146.520
Primary: North Shore; Port Coquitlam	146.535
Primary: Bowen Island; Surrey	146.550
Intermunicipal Group 1 Coordination	146.565
Primary: Lions Bay/Vancouver/Delta/Langley	146.580
Primary: Port Moody; Sec. Burnaby	146.595
Secondary: Vancouver/Surrey	147.420
Secondary: Vancouver (UBC) / Maple Ridge	147.450
Primary: White Rock/Chilliwack; Sec. No. Shore	147.480
Secondary: Burnaby/Pitt Meadows	147.510
Primary: Delta; Sec. Abbotsford	147.540
Primary: Hope; Sec. Delta; ALSO EMBC	147.570



We're

QRT

Another Field Day

and other thoughts

John Schouten VE7TI

Our course candidates study hard and for many it is a battle to grasp all the concepts around basic electronics, how transceivers and antennas work and a myriad of other foreign concepts. But once you write that exam and receive your certificate you have really accomplished something that you should take pride in.

Most governments support amateur radio because there is an understanding that amateur radio will assist if an emergency occurs. In exchange for that understanding we receive a huge portion of the radio spectrum. You've likely heard the term 'use it or lose it'. That has never been more important than now because there are constant pressures from industry to give up Amateur Radio bandwidth for commercial purposes. I admit that I could be described as an old fogey at this time in my life, but I don't think that I am unique in believing that holding an amateur radio certificate is a privilege, not a right... a privilege that we have to exercise and use frequently.

When I monitor the bands on most days, I don't hear nearly the activity that I heard when I first started in the hobby. Solar conditions aside, even now, as propagation becomes more favourable in the current solar cycle, there is often quiet on

the HF bands where I expect activity. Even working VHF and UHF on local repeaters reveals much dead air. Now I realize that other technologies like cell phones have reduced dependence on local communications via radio. I'm retired, but when I was working, I would monitor local repeaters during my drive to and from work. We called the afternoon rush hour 'the rolling home show,' because many would be active during those times. You heard traffic and weather reports, and the occasional autopatch telephone call, as well as a lot of good conversation.

Field Day is another story, at least on the HF bands. So much activity that, as a contester, I have a difficult time finding a spot on the band to call CQ. Here at SARC/SEPAR we were even able to make FM contacts on simplex frequencies as part of our 'Get On The Air' (GOTA) station, but there is far less use than years ago.

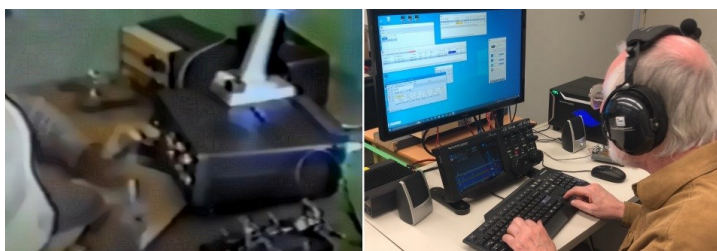
Field Day... an opportunity to show our local community, and the whole world as a group, what Amateur Radio is capable of and what we offer.

This year we operated from our Operations and Training Centre (OTC) location as the lifting of COVID restriction happened too late and prevented us from reserving our pre-COVID field location, and the additional planning that site requires.



A sincere thank you to all our Field Day visitors, but especially to City of Surrey Councillors Brenda Locke & Linda Annis for recognizing that what we do as Amateur Radio operators and civic volunteers is more than just a hobby.

This Field Day also made me think of the event in years past. Our local group, Surrey Amateur Radio Communications (SARC) has been around since the mid-seventies. I cannot find a record of the first Field Day, but we have grainy 8mm video of Field Days in 1985, 1986, and 1987. It struck me how much field day has changed, not from the nature of the event itself, but for the tremendous changes in technology that we have seen since that time. It prompted me to create a couple of comparison photographs.



1985 vs 2022: No more paper logging and SDR transceivers

1985 vs 2022: Antennas for every purpose and mode. Here Moon-Bounce, our 'BigFoot' and Satellites.



1985 vs 2022: That sense of accomplishment and pride in the hobby remains the same

In closing and going QRT for this issue, I'd like to encourage our readers to make an effort to "use it". Even if, when you step into your vehicle you come on the air with your callsign and 'monitoring', you will have let others know that you are there.

~ John VE7TI

Top right: City Councillors Linda Annis and Brenda Locke flank former City Councillor and Provincial MLA Marvin Hunt, who is also a graduate of our course.

Bottom: Councillor Brenda Locke after making a contact at our GOTA station. Coaching is Manvir VA7BK1.



SARC SOCIETY DIRECTORS 2020-2021

PRESIDENT

Steve Mclean VE7SXM
[president at ve7sar.net](mailto:steve@ve7sar.net)

VICE PRESIDENT

John Brodie VA7XB
[vicepresident at ve7sar.net](mailto:john@ve7sar.net)

SECRETARY / WEBMASTER

Jeremy Morse VE7TMY
[secretary at ve7sar.net](mailto:jmorse@ve7sar.net)

TREASURER

Scott Hawrelak VE7HA
[treasurer at ve7sar.net](mailto:scott@ve7sar.net)

DIRECTORS

Gord Kirk VE7GK
(SEPAR Liaison)

Kevin McQuiggin VE7ZD / KN7Q

John Schouten VE7TI
(SARC Publications/Blog/Social
Media & Courses)
[communicator at ve7sar.net](mailto:john@ve7sar.net)
[course at ve7sar.net](mailto:john@ve7sar.net)

Stan Williams VA7NF

SARC MEMBERSHIP, NET & CONTEST MANAGER

John Brodie VA7XB
[membership at ve7sar.net](mailto:john@ve7sar.net)

SARC QSL MANAGER

(pro tem) John Brodie VA7XB

SARC REPEATER MANAGER

VACANT
[repeater at ve7sar.net](mailto:vacant@ve7sar.net)

A look back...

From The Communicator—August 2012



FD 2012

The SARC/LARA/SEPAR team, operating as VE7LSY, did well at Field Day.

Our submitted points were as follows:

Total points: 2193 QSO points x 2 (for low power) + 1150 Bonus = 5536 total compared with 3720 last year.

By comparison, the top VE7 score (VE7SCC) had 4648 in 2011.

In 2011 top five VE total scores in our category

VE7SCC	4648
VE3RL	3976
VE7LSY	3720
VE3SAR	3452
VE3RAM	3064



July—August

Time for a break

Summer has arrived albeit somewhat late for our area. We will have social gatherings in lieu of a membership meeting on July 13 and August 10. Please join us at the OTC, 5756 142 Street, Surrey.

Regular meetings will resume on the second Wednesday in September, possibly in person.

Down The Log...

SARC Monthly Meetings

2nd Wed. (Sept-Jun)
1900 hrs at the [Surrey Fire Service Training Centre](#),
14923 - 64 Avenue,
Surrey, BC. Here is a
what3words link and map:
<https://what3words.com/markers.addiction.ozone>

Weekly SARC Social

Saturday between 0730
and 0930 hrs at the
Denny's Restaurant, 6850
King George Blvd., Surrey
BC

Workshops

Saturday between 1000
and Noon at the OTC
5756 142 Street, Surrey

SEPAR Net

Tuesday at 1930 hrs local
on 147.360 MHz (+)
Tone=110.9

SARC Net

Tuesday at 2000 hrs local
on 147.360 MHz (+)
Tone=110.9

VE7RSC Repeaters

2m North: 147.360MHz+
Tone=110.9Hz
IRLP node 1736
Echolink node 496228
1.2m: 223.960 Mhz -1.6
Tone=110.9Hz
70cm: 443.775MHz+
Tone= 110.9Hz
IRLP node 1737

2m South: 147.360MHz+
Tone=103.5Hz Fusion
capable; No IRLP/EchoLink

SARC hosts an Amateur Radio net each Tuesday evening at 8 PM. Please tune in to the VE7RSC repeater at 147.360 MHz (+600 KHz) Tone=110.9, also accessible on IRLP node 1736 and Echolink node 496228.

On UHF we operate a repeater on 443.775MHz (+5Mhz) Tone=110.9 or IRLP Node 1737.

We are looking for a SARC Net Manager. Its not a difficult job and, if you have some time to spare, we'd like to hear from you. Basically it involves scheduling someone to do the Tuesday evening weekly net.

	SARC Net 20:00 Hrs
1 st Tuesday Standby	Jean-Luc VA7JLU Reg VA7ZEB
2 nd Tuesday Standby	Andrew VA7LGN Sheldon VA7XNL
3 rd Tuesday Standby	Rob VE7CZV REG VA7ZEB
4 th Tuesday Standby	Kapila VE7KGK John VA7XB
5 th Tuesday Standby	Reg VA7ZEB John VE7TI
Want a turn at Net Control? Contact the SARC Net Manager	



We Have A SARC Patch!

These are suitable for sewing on a jacket, cap or your jammies, so you can proudly display your support for SARC.

The price is \$4 each or three for \$10 and they can be picked up at a meeting or the weekly Koffee Klatch.

We thank our many supporters,

Please support them.

Successful Guide to the
Basic Exam
for the
Canadian Amateur Radio
Operator Certificate

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www.ve3yt.com for the guide, my intro book and cw course



Hamshack. ca

- Receives 12,000 or so visits per week
- Has over 500 registered users
- Usually sits at about 250 active listings as items seem to move very quickly

~ Don Rosberg, VE7DXE
250.380.8401

These folks did a great job on the hydraulics for our antenna trailer.

18549-97 Ave., Surrey, BC, V4N 3N9 604-882-9787

<http://www.htihydraulics.com/about-us.html>

